RoutePro 3000 - User Help

RoutePro 3000 - User Help

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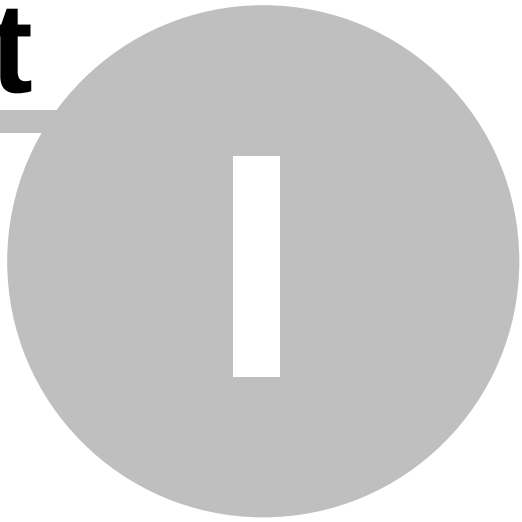
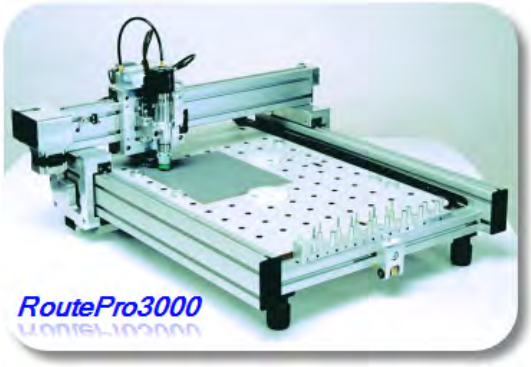


1 Welcome to RoutePro3000

RoutePro3000 makes prototyping easy, efficient and fun



RoutePro3000 is an environment for handling drilling, milling of materials.

Modules can be obtained to extend the features of RoutePro3000.

Now available: RoutePro3000Extra version which will give the user more features and flexibility.

The following modules are available or under development:

- LaserPro3000
  This module is used to produce laser images.
  Please note that this module requires a Laser Unit.
  read more...
- DispPro3000
  This module is used for dot and line dispensing
  Please note that this module requires a Dispense Unit.
  read more...
- Calibrate3000
  This module is used to calibrate the position of your material, it has also extended camera features.
  Please note that this module requires a Camera.
  read more...
- Documentation
  This module is used to create documentation about your machine and your projects
  read more...
- RoutePro3000Extra
  This module is used to extend RoutePro3000 with extra features.
  read more...
- Inspection
  This module is used to inspect your work
  read more...
- Q-Code
  This module is used to create Q-codes for your projects.

read more...

Remote3000

This module is used to operate RoutePro3000 from another application.
read more...

Script

This module is used to automate RoutePro3000
read more...

This help is designed both as a course in using RoutePro3000 and as an ongoing reference while you are working with the program.

Getting started

- Study the Introduction and Quick Start Tutorials sections to familiarize yourself with the basics of the program.
- Check out all the links in the **Help** tab – plenty of help is available!
- Click on any picture to zoom in.

Part II

2 FAQ: What's New?

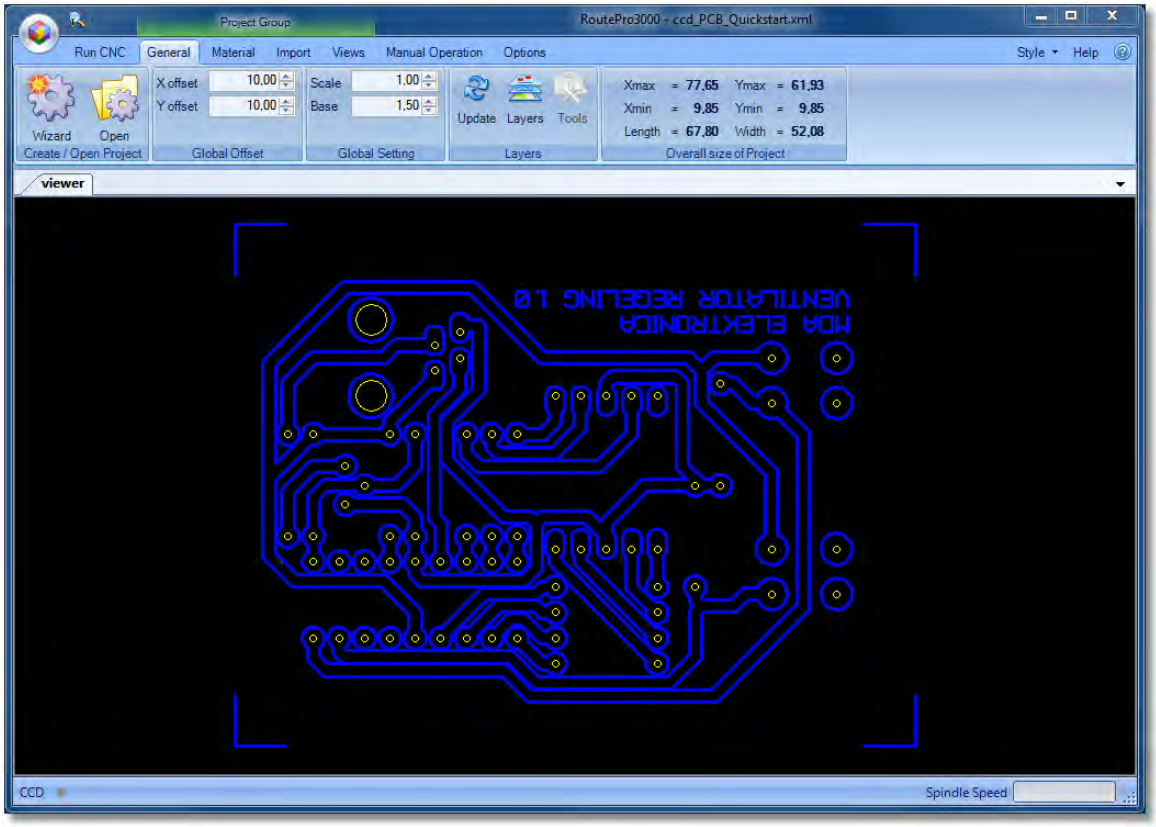
The user interface of RoutePro3000 is completely different then the previous versions of RoutePro3000.
The whole user interface has been redesigned to meet the latest Windows technology.

So we recommend that you work through the Introduction and Quick Start Tutorials chapters before you start working with RoutePro3000.
This will help you to familiarize yourself with the all the features.

2.1 User Interface

RoutePro3000 has undergone a complete makeover.
The user interface is completely redesigned to make it very user friendly.

All the buttons are now categorized into sections on to a ribbon bar.
So you will only see the buttons you need for the task you are currently performing.
The output screen is integrated into the main screen.



The RoutePro3000 user interface

2.2 License system

RoutePro3000 now operates under a license system.

This system gives RoutePro3000 great flexibility.

Using a license system enables us to provide you with modules for particular features.
It gives you the opportunity to select only modules you need so you don't pay for something you will not use.

▾Extra information

When you purchase a CCD machine, the standard RoutePro3000 system is provided free of charge.
The module licenses are not for free. To obtain a module license, please contact your supplier.

When you start RoutePro3000 for the first time, the evaluation period will start, during this period you can use
all the features but it is mandatory that you register / activate the program before this period expires.

You can test the extra modules during an evaluation period but you can only activate
this modules once you have registered / activated RoutePro3000.

Note: *modules may require extra hardware to operate correctly.*

2.3 Important Changes

The major change is the complete redesign of the user interface
Another important change, compared with the older RoutePro versions is that we now work with projects.

▾Extra information about projects

A project consists of a folder where your data files and configuration files are stored.
Building projects is a simple tasks by using the Project Wizard.

Why projects?

- Project data is all stored together so easy to find.
- Easy to maintain.
- Configurations are stored per project.

The data in the project folder does not replace the data that is generated by your designer software
It is just copied to the project folder and keeps the original data intact.

If you change the design, RoutePro3000 will notice that there has been changes and replaces the files in
the project folder with the updated ones.

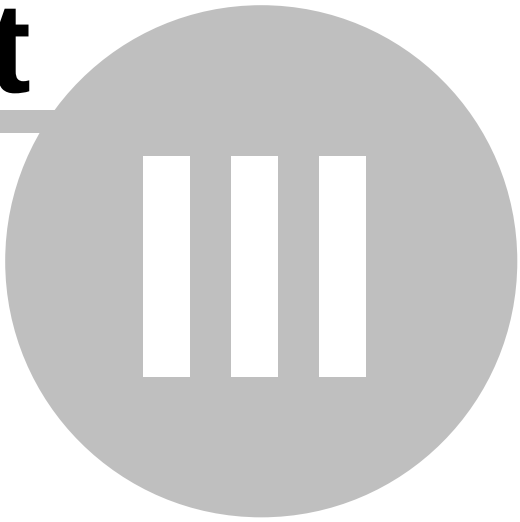
Note: *If the original data folder has been renamed or moved the project cannot synchronize anymore*

2.4 New and Improved

Although RoutePro3000 is redesigned, all the good old features are still there and a lot of new features have been added.

- First important new feature is the Project Wizard, which creates / updates projects for you.
- In the standard RoutePro3000 version you have now 4 data layers so yo can load all the important layers:
  - Drill data
  - Milling data for the top layer
  - Milling data for the bottom layer
  - Fixing hole layer.
- All project dependent parameters are stored with the project, so it's very easy to use your project in future without worrying about these settings again.
- The global options are now categorized in small sections so they are easy to handle.
- There are multiple Global settings, depending on the type of machine, step-size of the motors etc.
- Extensive default tools tables, depending on tool-type, material-type and diameter.
- Floating and docking windows.
- Instructions / tips per layer can be provided while creating a project, which can be showed during processing.
- Error reports can be generated and send for easy support.
- Optional: laser module
- Optional: Calibration module
- Optional: Dispense module
- Optional: RoutePro3000Extra
- Optional: Documentation
- Optional: Inspection
- Optional: Remote module
- Optional: Scripting
- Optional: Q-Codes
- From time to time new modules will be added
- and more....

Part



3 Introduction

The topics in this section provide some basic information about RoutePro3000, what it is for and what you can do with it.

How to get started

- See Getting help for details on using this help and getting more information about RoutePro3000.
- Study this Introduction chapter and The User Interface sections to familiarize yourself with the program.
- Then work through the Quick Start Tutorials to familiarize yourself with using RoutePro3000.

Learning more

- See Advanced Topics for, you guessed it, instructions on more advanced features!
- See the Reference section for more detailed background information.

3.1 About RoutePro3000

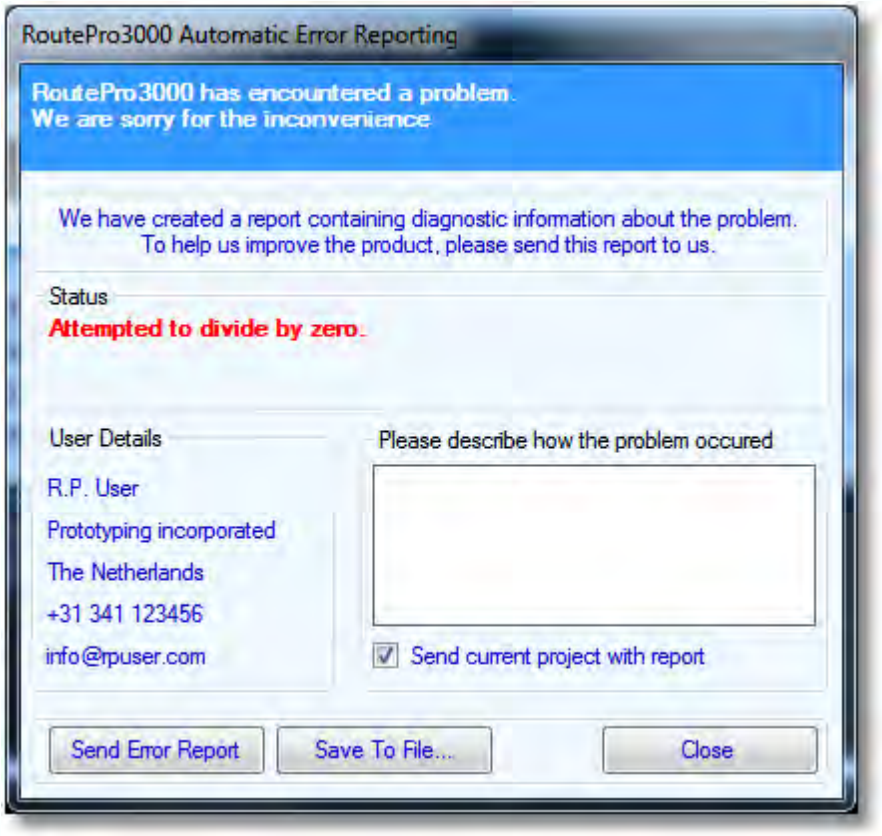
RoutePro3000 is a professional program for processing drilling and milling data.

Modules are available for dispensing, laser imaging, material calibration and Remote operations.
From time to time new modules will be added.
Import formats are: HPGL and Excellon

▾Error reporting

If for some reason the program generates an error, you will get the option to send an error report. We can use this report to solve this problem and therefore improve the program.
In most cases you can continue working.

In case you encounter a problem but there is no error report, you can generate a report by clicking the button in the About box. This will generate the following report:



Please describe your problem and send the error report.

▾Need Special requirements?

If you have special requirements for your CCD machine, please contact your dealer for information in most of the cases our programmers can make a special module for you.

3.2 Why RoutePro3000?

Save time

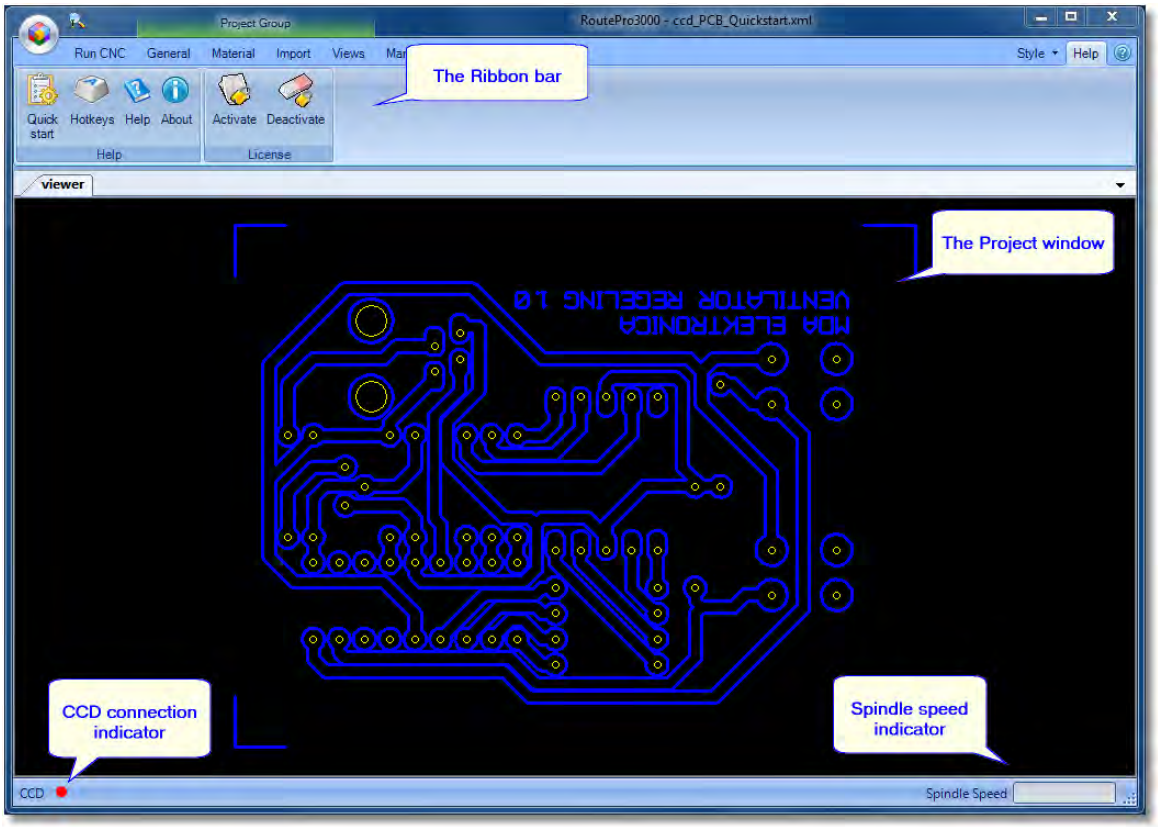
RoutePro3000 helps you to create better prototypes quicker.
Despite its power the user interface and work flow are amazingly intuitive.
The time required for setting up and producing prototypes is very short.

Working with RoutePro3000 is fun.

Don't believe it? Give it a try with RoutePro3000...

3.3 The User Interface

The RoutePro3000 window has two main components: The Ribbon Toolbar and Viewer.



The RoutePro3000 user interface

The Ribbon Toolbar

RoutePro3000's functions are accessed primarily through the Ribbon Toolbar (or Ribbon for short).
It is divided into tabs that group functions according to tasks.
All the buttons, fields and tabs are explained in detail, in the reference section.

Viewer

The Viewer is used to display the data and to select data to process.

3.4 Getting help

RoutePro3000 has an extensive help system.

To get started, your main source of information should be this help file.
We have designed it to provide all the information you will need for using and learning RoutePro3000.

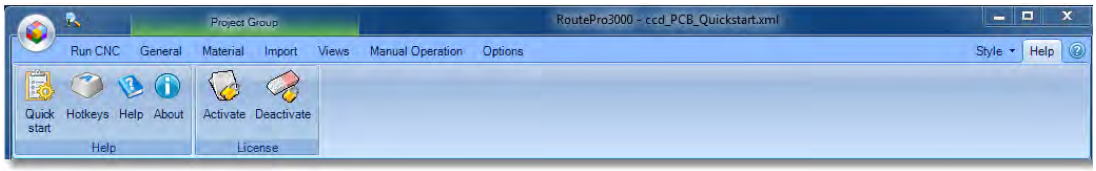
▾Help on this Help system

- If you see a picture you may click on it to see it's actual size.
- If we suggest to click a button, the button text will have a yellow background
- If you see an arrow in front of text, clicking the text will expand the text. ▾click now
  This is the expanded text, clicking the arrow again hides this text again.

if you see the hot key symbol then the command can also be executed by pressing the key that follows it.

Displaying the help

- The quickest way to display the help is to press F1. If context-sensitive help is available it will be displayed automatically.
- To get started click on the Quick Start button.



- Select the Help tab in the Ribbon for additional help options.

Contacting support

Note: *first read our support policy to see which type of support applies to you.*

- Contact your local supplier directly or send an Email.
- Before contacting support, please make sure that you really can't find the information in this help manual

Getting a printed user manual

You can print out the complete RoutePro3000 help manual if you like, you will find it as PDF in the document folder.

3.5 How to order modules

You can order modules for RoutePro3000 by contacting your local supplier.

3.6 Support policy

About our support policy.

RoutePro3000 has been build from scratch so you can imagine how many hours of work our developers have spent in programming.
However we feel that every customer should be able to use the new RoutePro3000 with our machines.
That includes customers that use our machine and old RoutePro versions for many years now.
So will give you this state of the art program for free.

Over the years we have sold many machines worldwide.
You can imagine, if we have to handle support for all this customers at no costs,
for a program that was given for free, it would give us many hours of non payed work extra.

RoutePro3000 comes with an extensive user-manual where you can find answers to 99.9% of your questions.
So we do not expect that there will be a great need for support, but we want to prevent getting overloaded
with questions for which the answers can be found in the manual, just because support is free.

Existing customers

If you have purchased a new CCD machine, from one of our dealers, before 01 July 2012
And you really need support you can purchase support tickets. Which can be used to solve your problem.
This could be by telephone or if necessary a team-viewer session with our support center.
Please contact your local dealer to purchase support tickets.

New customers

If you have purchased a new CCD machine, from one of our dealers, after 01 July 2012
You are entitled for a maximum of 1 hour free support during 1 year after the purchase of the CCD machine.

If you encounter problems

After many many hours of testing RoutePro3000 it is always possible that RoutePro3000 does not what it supposed to do.

If you find a problem with the software you can send us an email with detailed description of the problem plus screen shots,
and most important, how did it occur. Can it be reproduced?
We will try to solve the problem directly if it is a problem that effects the whole program else it will be solved in the next release.

Note: *Sometimes RoutePro3000 gives you the opportunity to send an error report, please do that as well, this makes problem solving much easier*

User input

We highly appreciate your input.
If you have suggestion of how to improve RoutePro3000 please tell us, if we think it is useful for other users as well we can implement this in a next version.

3.7 Copyright

document.

Part IV

4 Quick Start Tutorials

The tutorials in this section provide a quick introduction to using RoutePro3000.
They are intentionally kept brief so that you can actually start using the program as quickly as possible.
The objective is not to teach you every single detail but to familiarize you with the basic principles and the way the program works.
For full details on the procedures described in the tutorials please refer to the Reference section.
Once you get used to working in the program you will also find plenty of more useful help and support in the Advanced Topics section.

Your best start with RoutePro30000 is to work down the list we provided for you. (click on an item)

Quick start

- Register / Activate Licenses
- Find CCD machine
- Creating a project
- Updating a project
- Using the layer viewer
- Using the Viewer
- Calibrate the Camera
- How to use the calibration module

4.1 Find CCD machine

RoutePro3000 can work with or without a connection to a CCD machine.

A CCD machine should be connected to a serial port or a USB port (using an USB to Serial converter)

If there is no CCD machine attached you have the option to work in the demo-mode.
In demo mode you can perform almost all the actions you can perform in normal mode.
So you will be able to get familiarized with the program.
You can also create your projects, they will work fine for an attached machine.
However there are some limitations.
In demo mode: the ATC option does not work because this is not simulated.
Work in demo-mode: Continue with Create a project

If you have a CCD machine connected to the computer.

Start RoutePro3000

The program shows the license screen, if you have already activated RoutePro3000 the screen will show your details and will hide after a few seconds.

If RoutePro3000 is not yet activated, you have the choice to run the program during the evaluation period.

Searching for a CCD

Now the program will search for an attached CCD.
Expand the text below that apply.

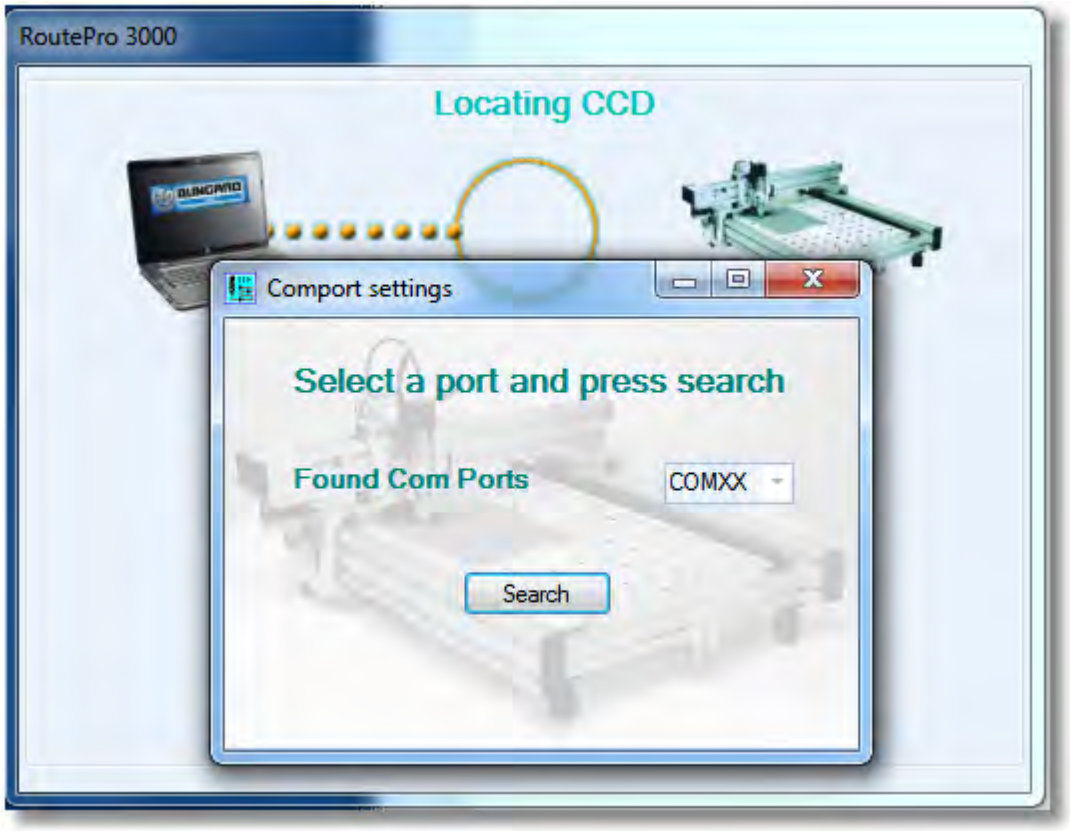
▾CCD found.

If the CCD is found the program will start.
Continue with Create a project

▾CCD not found

▾Try to find in manually

The following screen appears:



Open the drop-down box and select the port where the CCD is attached to (available ports will be shown) then press search.

▾CCD still not found

▾Enter demo mode

If the CCD is not found the program will run in demo mode.
Continue with Create a project

▾Exit RoutePro3000

Close the program.

▾Stop searching

▾Enter demo mode

If the CCD is not found the program will run in demo mode.
Continue with Create a project

▾Exit RoutePro3000

Close the program.

4.2 Create a project: introduction

Creating a ▾project in RoutePro3000 is a simple task.

A project consists of a folder where your data files and configuration files are stored.
Building projects is a simple tasks by using the Project Wizard.

Why projects?

- Project data is all stored together in a project folder, so projects easy to find.
- You can give your project a sensible name.
- Easy to maintain.
- Configurations are stored per project.

The data in the project folder does not replace the data that is generated by your designer software
It is just copied to the project folder and keeps the original data intact.

If you change the design, RoutePro3000 will notice that there has been changes and replaces the files in
the project folder with the updated ones.

Please note: If the original data folder has been renamed or moved the project cannot synchronize anymore

Projects are always created using the ▾Project wizard

This wizard collects all the data files for you and creates the project, it searches for default tools

Read more....

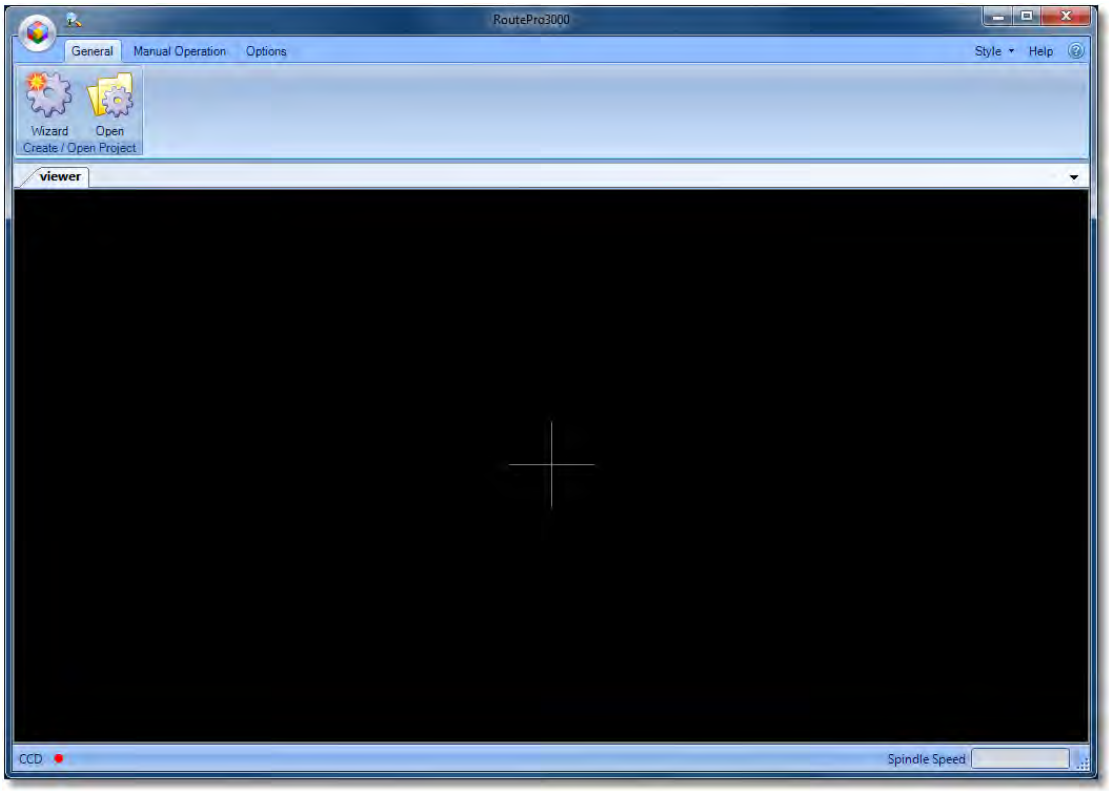
4.2.1 Project Wizard

Start RoutePro3000

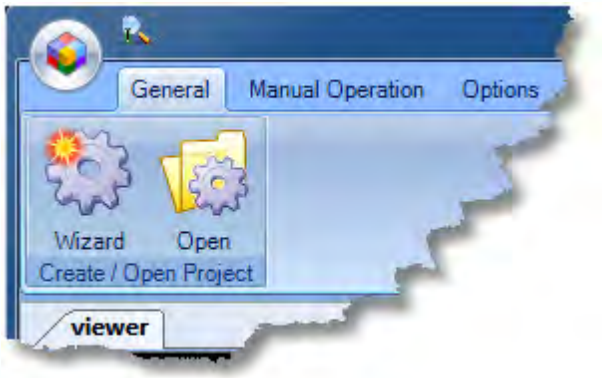
The next screen appears if the following conditions are true:

- RoutePro3000 is activated or runs under the trial period.

- There is a CCD connected or it runs in demo mode.

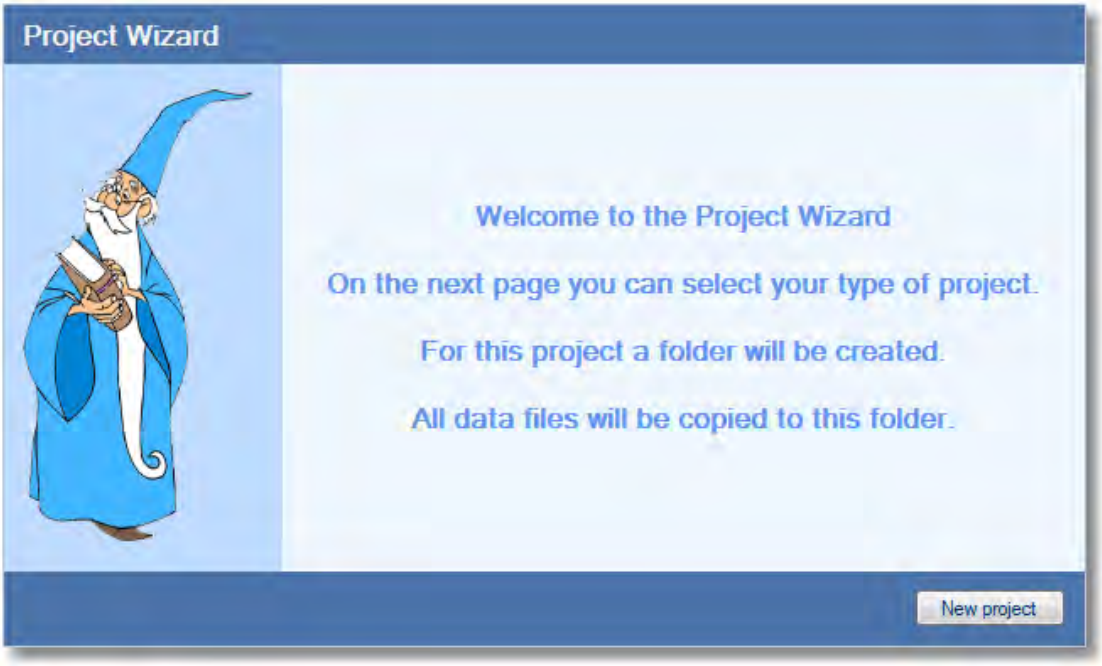


There are four Ribbon tabs visible, please select the General tab if this is not the active tab.



Click the Project Wizard button.

The Project Wizard will show the welcome screen.



Note: *If you start the Wizard while there is an active project, there will be an Update Project Button visible.*

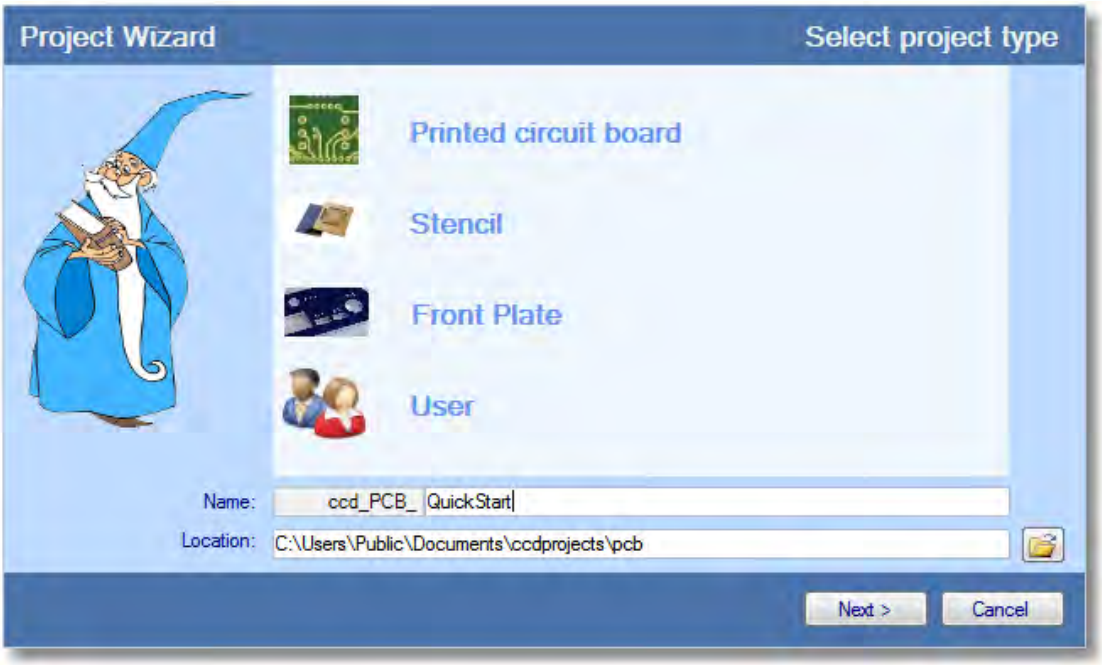
Press New project

The following screen will show.

⚠ In the standard RoutePro3000 version, you may only select **Printed circuit board** for your project.

Here you can make a selecting for your project type.

Select Printed circuit board

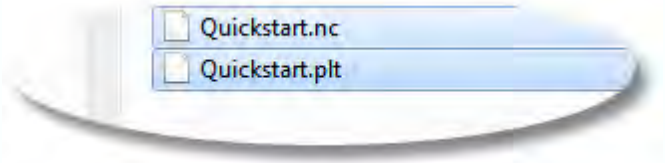


Now the Name and location fields are filled in with the default values.
You only need to enter a project name, in this case we have entered **QuickStart**.
Note: *To identify RoutePro3000 projects, the name of your project will always be preceded by the type of project, in this case* ***ccd_PCB_*** *you cannot change that.*

By pressing the folder button you may select a different folder to store your project.

Press Next

This will open the load file dialog window,
Go to the data files folder on your CD and select both files (Quickstart.nc and Quickstart.plt)

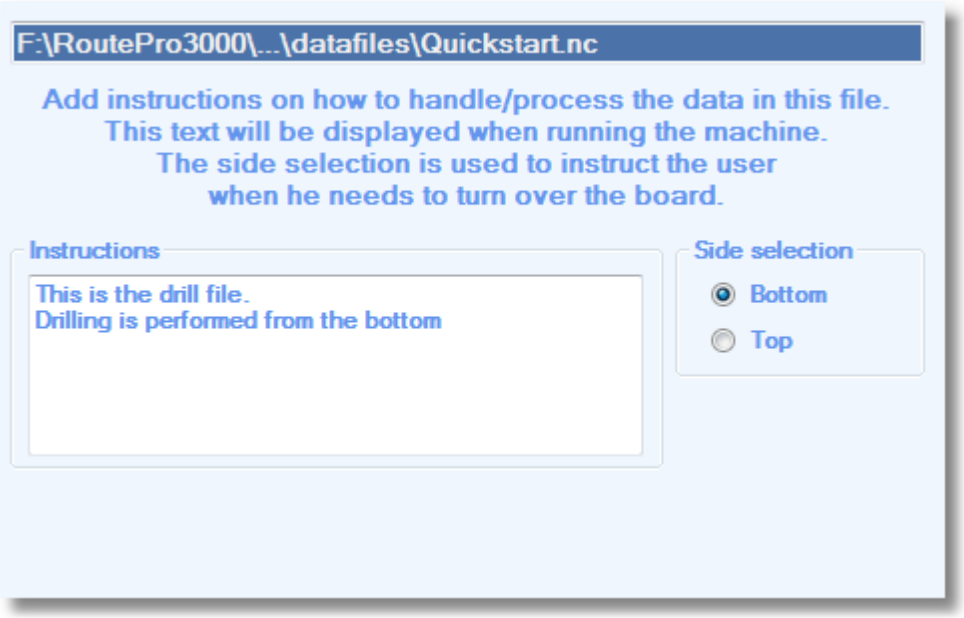


Quickstart.nc contains the drill coordinates
Quickstart.plt contains the milling data.

Note: *In Routepro3000 standard you may load up to 4 files per project, in the RoutePro3000Extra version you can load up to 16 files per project.*

Press Open to load the files

The next window will show:



You will see, at the top of this window, the name of the data-file. In this case it is Quickstart.nc but,
depending on your file system, it could also show Quickstart.plt first.

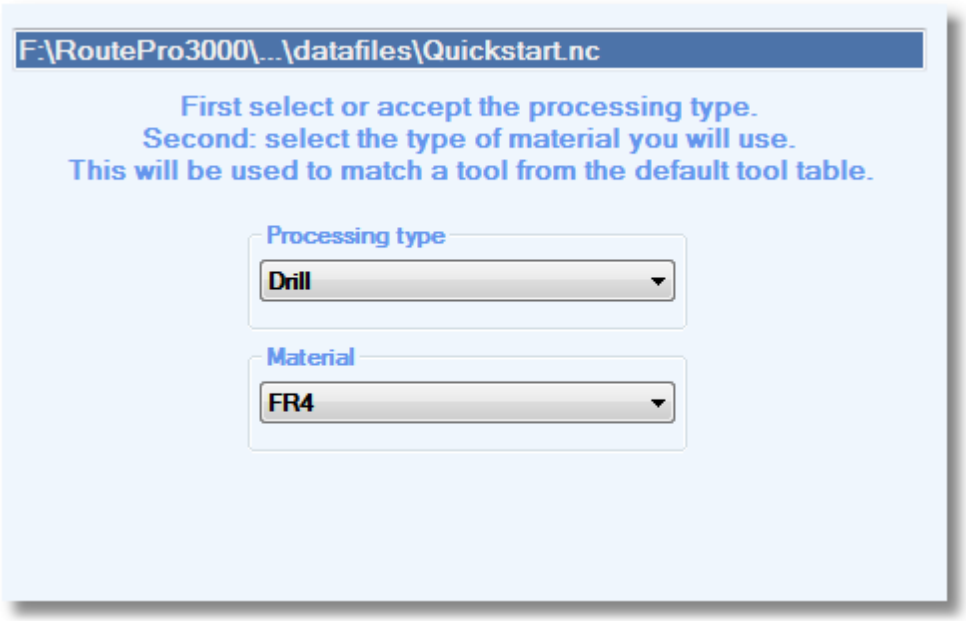
Note: *The explanation that follows assumes that the first data-file is Quickstart.nc. this is no problem for this tutorial because both files are handled.*

You may enter instructions for this layer (not required) in the Instruction field, this could be useful for later reference
or if you need to instruct your machine operator.

You may also select the Side for which the data is intended. This is useful for future reference and will be used in the
RoutePro3000Extra version for automation (running scripts).

Press Next

The next window will show:



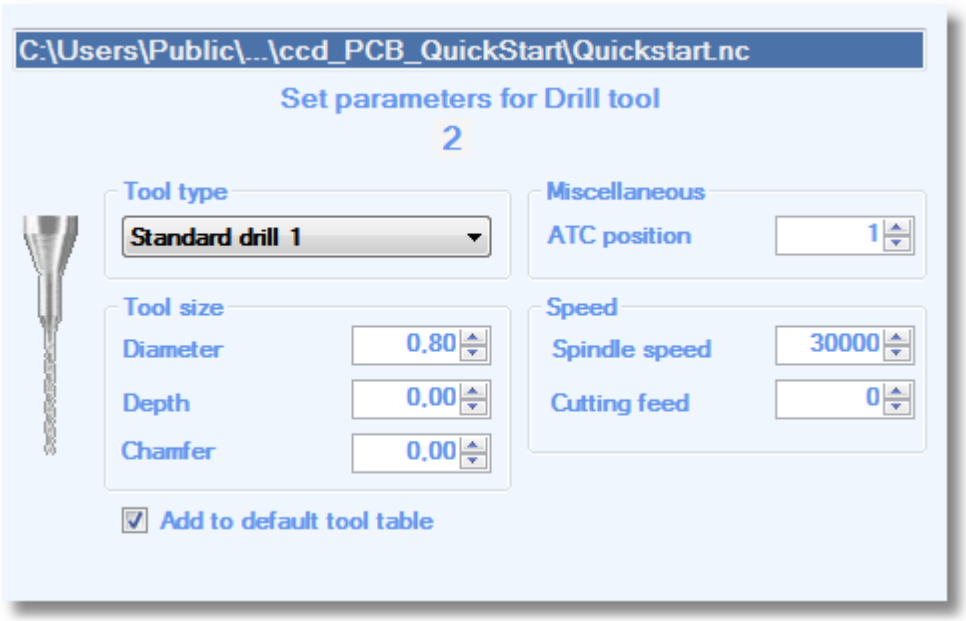
RoutePro3000 determines automaticly the **Processing type** it needs to handle.
Normally you do not have to change the Processing type here, however it could be the case that you
have a module installed that needs to handle the data in a different way. Like laser or dispensing.
In that case you can select the correct Processing type.

You may select the material type you are going to use or just leave it on FR4

Note: *The material type is used to get the correct tools from the default tool table.*

Press Next

The next window will show:



Now we are getting somewhere, the tools that are found in the data file needs to get the process parameters.
The tool that needs to get parameters is in this case tool 2. As you can see, a few fields are already filled in for you.

Note: *The data file could contain a lot of tool definitions but only the tools that are actually used will be showed.*
Note: *If a tool is found in the default table, all the fields would be filled automaticly.*

▾Field descriptions

Tool type

You may select here the type of tool you want to use for the current tool.
Note: *The tool type is used to determine which tool to get from the default tool table.*

Diameter

Defines the diameter of the current tool.
Note: *If the data-file contains tool parameters, like diameter this value will be used else you need to select the diameter manually.*

Depth

Here you can define the drill depth.
Note: *If you leave this field on 0,00 the drill depth is calculated automaticly, using the thickness of the used material.*

Chamfer

This defines the extra depth you need to drill the hole completely. The picture shows you the chamfer.

ATC position

This parameter instructs the Automatic Tool Changer, where to find the current tool.
Note: *this field will be hidden if the ATC is disabled in the option menu..*

Spindle speed

You may select the required spindle speed here.

Cutting feed

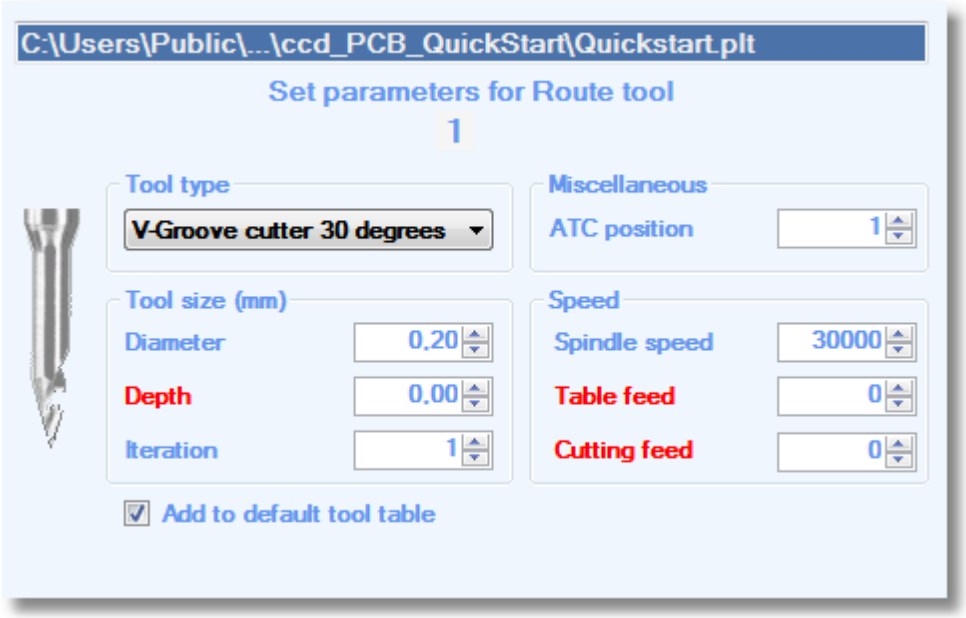
This determines the speed at which the drill will lower into the board.
Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height (Z free), from there it uses the Cutting feed..*

Add to default table

If a tool does not exists in the default tool tables, this box is checked and the tool will be automaticly added to the tables, unless you uncheck the box.
If the tool was retrieved from the default tool table, this box is unchecked, checking it will overwrite the default tool with your entered values. (not recommended)

Fill in the required fields and **press Next**, do the same for the other drill tools.
When all the drill tools have there settings, the next data-file will be handled by the Project Wizard.
The first two screens (Instructions, Process type and Material selection) are the same for all the data-files
so we do not spent more time in explaining them, just fill them in.

Press Next



The parameters for the milling data are almost the same with a few exceptions.
There in no chamfer parameter, instead there is an Iteration and a table feed parameter.

Note: *If a required field is not filled by the user and Next is pressed, it will show you a warning and the required fields will be shown in red.*

▾Field descriptions

Tool type

You may select here the type of tool you want to use for the current tool.
Note: *The tool type is used to determine which tool to get from the default tool table.*

Diameter

Defines the diameter of the current tool.
Note: *If the data-file contains tool parameters, like diameter this value will be used else you need to select the diameter manually.*

Depth

Here you can define the milling depth.

Iteration

If this parameter is greater then 1, milling will be done in multiple steps.
Example: requested depth = 3 mm, Iteration = 3 The first milling action will have a depth of 1 mm the next depth will be 2 mm etc.

ATC position

This parameter instructs the Automatic Tool Changer, where to find the current tool.
Note: *this field will be hidden if the ATC is disabled in the option menu..*

Spindle speed

You may select the required spindle speed here.

Table feed

This determines the speed that will be used while the tool is actually milling, the lower the speed the higher the result.
Note: *If the tool is raised the highest speed setting will be used to travel to the next location..*

Cutting feed

This determines the speed at which the drill will lower into the board.
Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height (Z free), from there it uses the Cutting feed.*

Add to default table

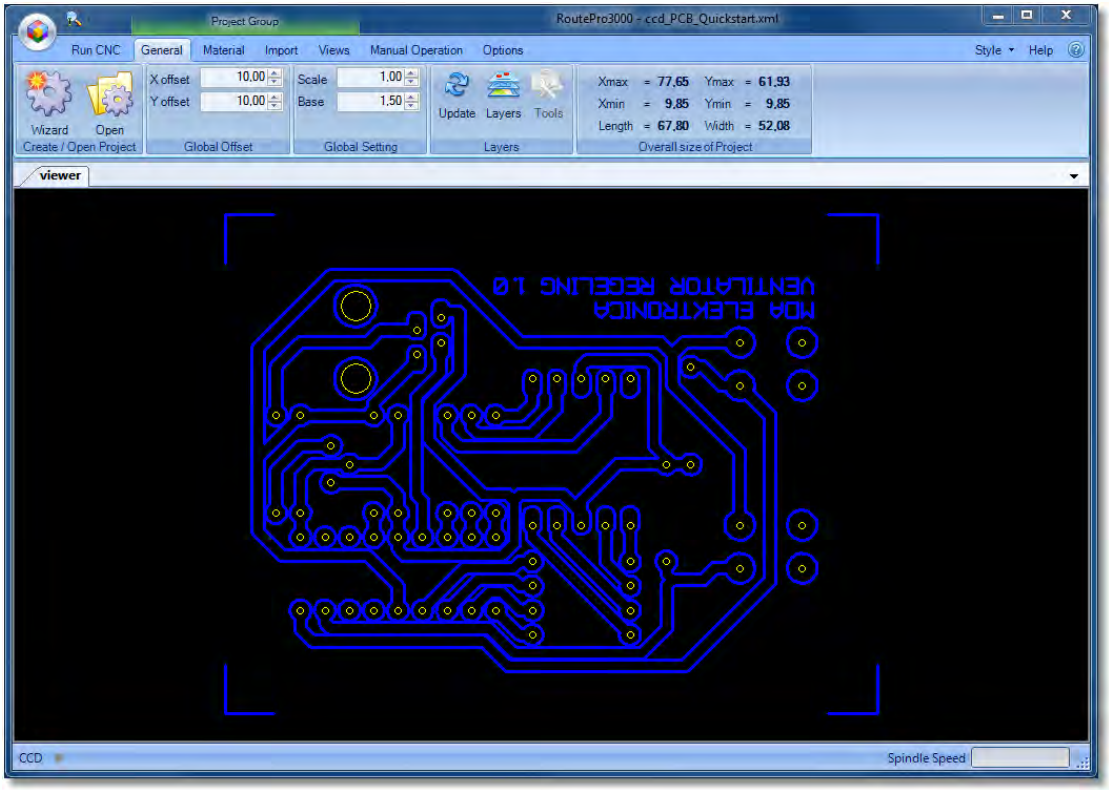
If a tool does not exists in the default tool tables, this box is checked and the tool will be automaticly added to the tables, unless you uncheck the box.
If the tool was retrieved from the default tool table, this box is unchecked, checking it will overwrite the default tool with your entered values. (not recommended)

Fill in the required fields and **press Next**, do the same for the other router tools.
When all the tools have there settings, the next data-file will be handled by the Project Wizard until all files are handled.

When all the data-files are handled the next window will appear:

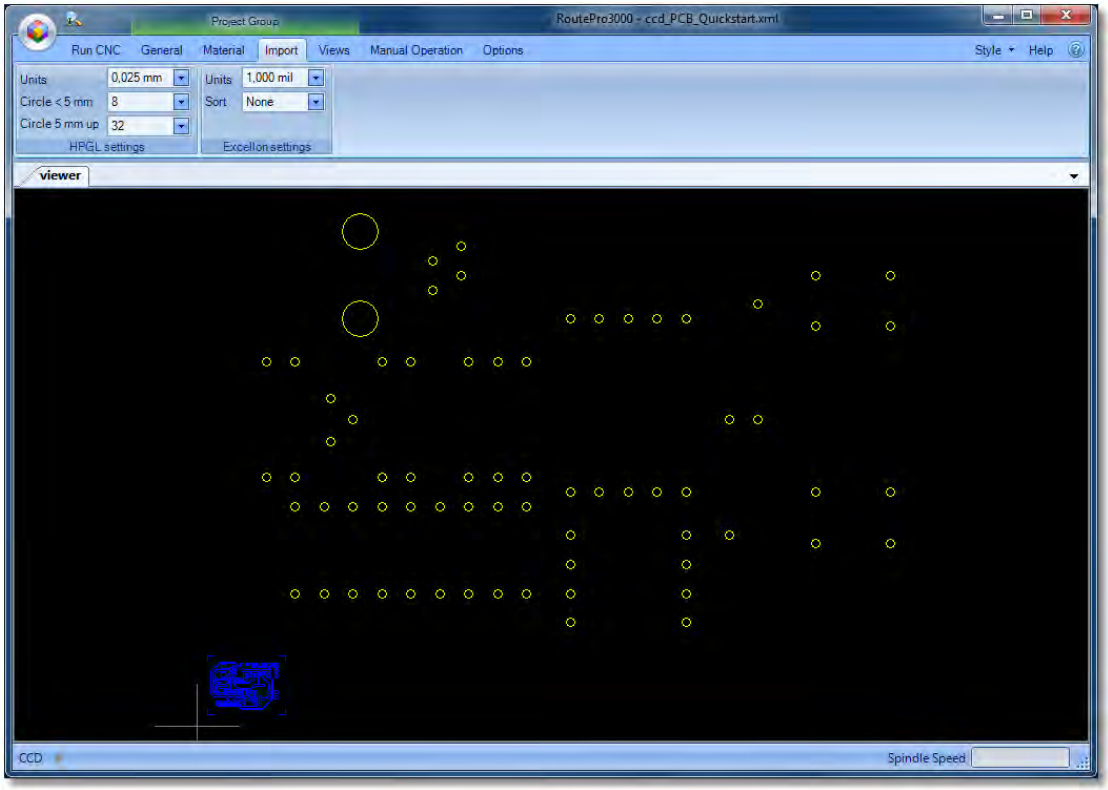
Press Finish and in the next screen OK.

Now the wizard is ready and your project will look like this



OOPS my screen looks different!

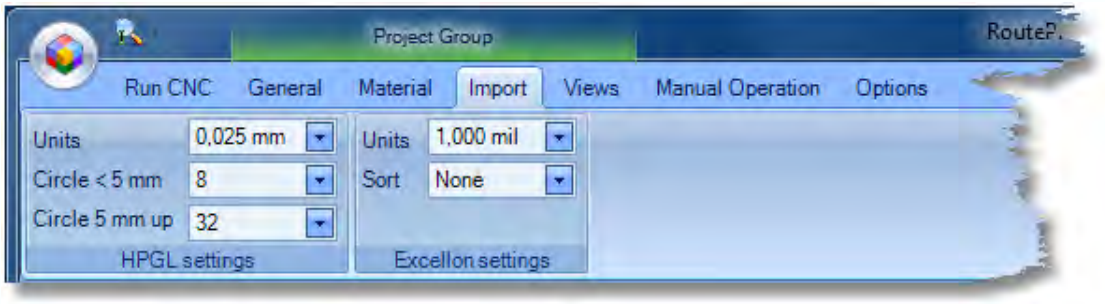
Depending on the used format in the data file, your screen could look something like this:



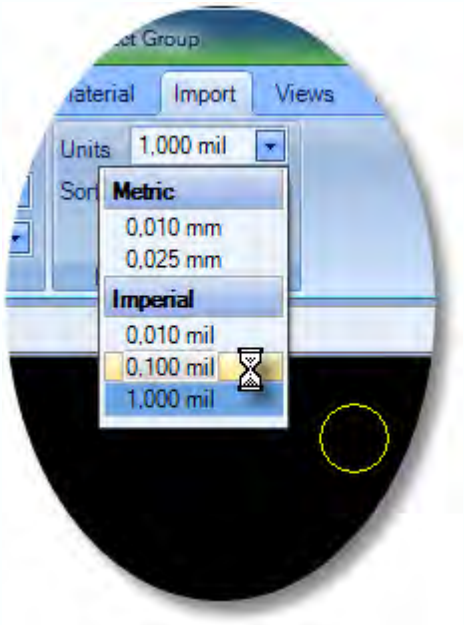
If this happens, most of the time the Import setting of the drill file (Excellon) is not correct. Don't worry in RoutePro3000 this is very easy to solve.

Note: *HPGL (milling data) is normally produced with 0,025 mm step, this is the standard, Excellon can come in different varieties.*

Select the Import Tab under the Project Group



Now select a different step size from the Excellon settings



As soon as you've done the selection, the data will be read using the new settings and your screen will update immediately.
Just for fun give it a try with some other settings so you see the power of this feature.

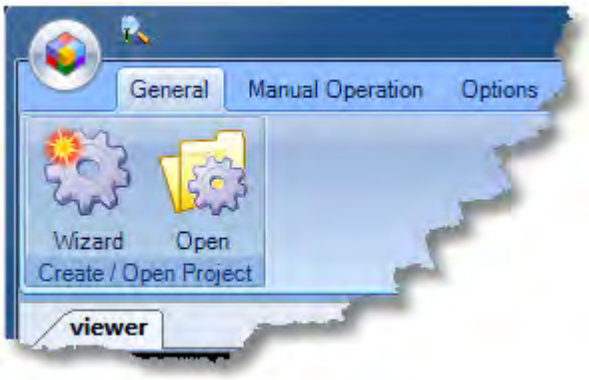
Note: *These settings are stored within your project so you only do this once.*

This concludes the Project Wizard tutorial.

4.2.2 Update a project

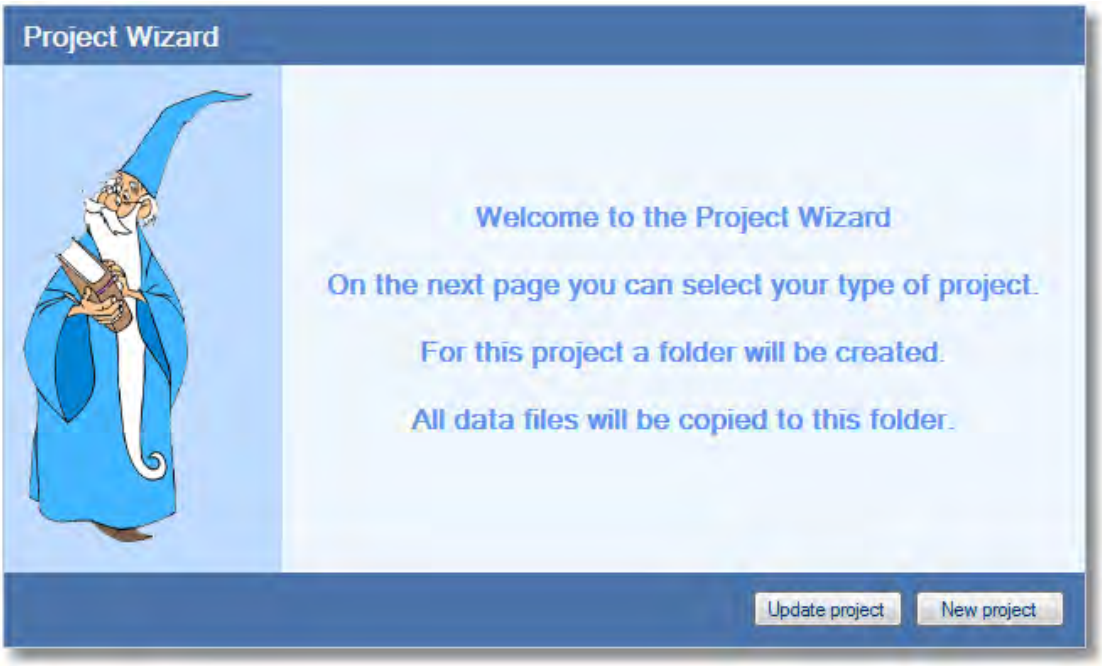
In case you want to add or delete data-files to your project, you can use the Project Wizard.

Note: *The project must be active before you can update it.*



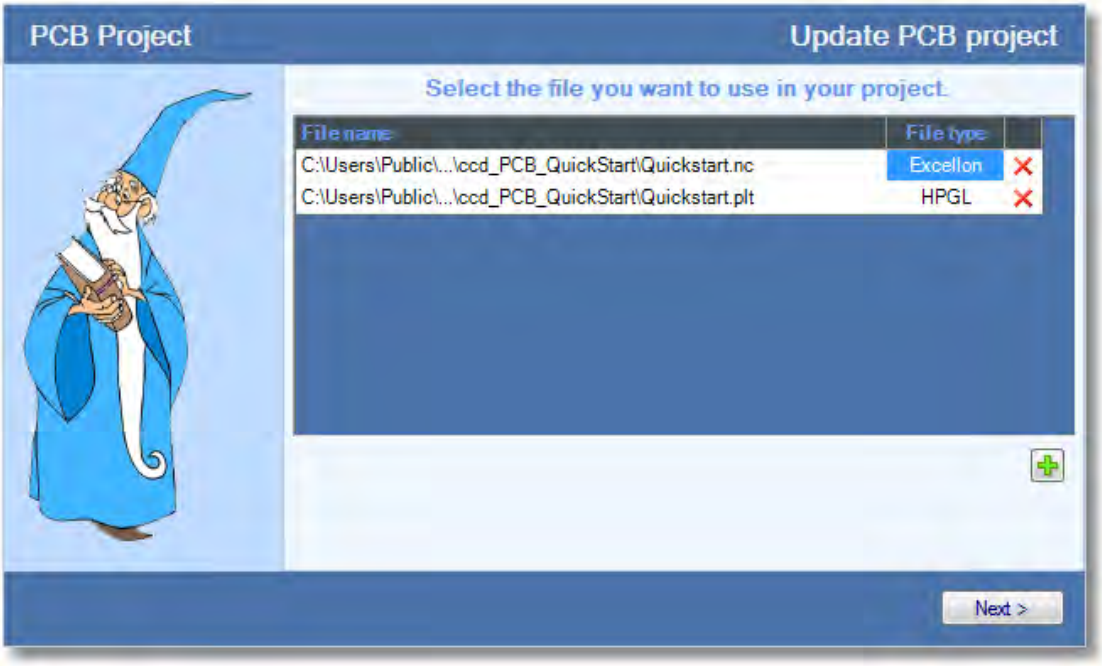
Press the Project Wizard button.

The Project Wizard will show the welcome screen.



Press the Update project button.

The next window will appear:



Here you can add or delete data files

Press this button to add data file(s) to your project
Then Press Next to continue, depending on the kind of data, you will be guided through the same windows as in creating a project.

Note: *In the standard RoutePro3000 you can add up to maximal 4 data files per project.*

Press this button to remove file(s) from your project

Note: *The selected file will be removed from the project folder but will remain untouched in your design folders.*

Then Press Next to continue, depending on the kind of data, you will be guided through the same windows as in creating a project.

Note: *if you did not add new files you will be guided to the end screen.*

This concludes the Update project tutorial.

4.3 Using the Viewer

The Viewer is used to display and select the data on the screen.
Several other windows, like tool windows, will be docked here when opened.

A tool window is a docking type of window, you may undock it by holding the mouse pointer
on the tab at the bottom and drag the window to another place. Now you can have both windows

in view

The following commands are available in the viewer.

The viewer hot-keys
These hot keys are only available if the viewer is the active window
Click in the viewer area to make it the active window.

F8	Zoom all
F5	Refresh Window
z	Zoom in
Z	Zoom out
Ctrl +	Draw zoom window
	Add data to selection by drawing a window around the objects
Shift +	Add data to selection
Alt + Mouse Wheel	Zoom in Zoom out
Only Mouse wheel	Pan up and down
Shift + Mouse Wheel	Pan left and right

Note: *you need to click in the viewer area to be able to use the hot-keys*

4.4 Calibrate the Camera

RoutePro3000 comes with a camera feature, which you can use for Capturing Route and Drill data.
If you purchased the Calibration Module, the camera will also be used for calibrating your boards.

But before you can use the camera, the camera position itself must be calibrated.
This means we need to determine the offset to the center of the spindle.

This tutorial assumes that there is a camera mounted on the machine roughly at **X value 8,00** and the **Y value 50,00** from the spindle center.

Note: *These values are actual negative offset values from the spindle center of view but they will be added to the actual*
head position while the camera mode is active, therefore they are presented as positive values.

Step 1

Place a piece of PCB material on the table and secure it so it cannot move.
Make sure it lays completely flat.

Step 2

Now open the Manual Operation tab en position the head on **X = 10, Y = 10, Z = 5**

Step 3

Start the spindle and set the step size to 0.1 mm, lower the head until a hole has been drilled. Raise the head and stop the spindle, wipe away the dust particles.

Step 4

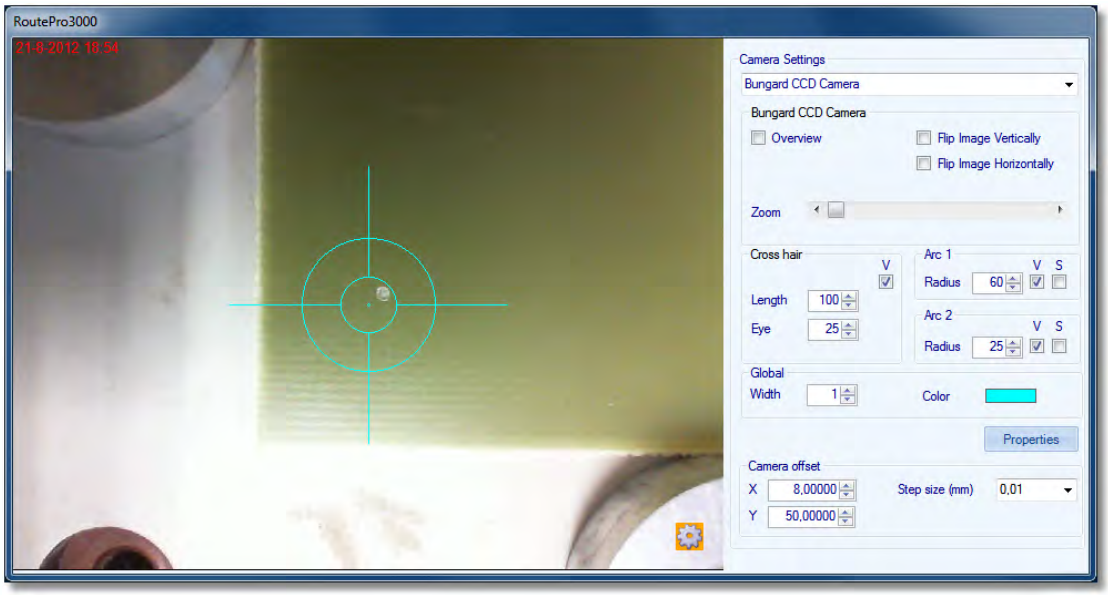
Press Show Camera, there will be another button visible: Calibrate Camera, press this as well. This will enable a special panel in the camera viewer, for calibrating the camera.

Note: *Calibrating is only available in the Manual operations Tab*

Step 5

The camera window shows up, press the little wheel in the lower, right hand corner to show the camera properties.
Under Camera offset in the camera property window, set the **X value to 8,00** and the **Y value to 50,00** this is roughly the offset.

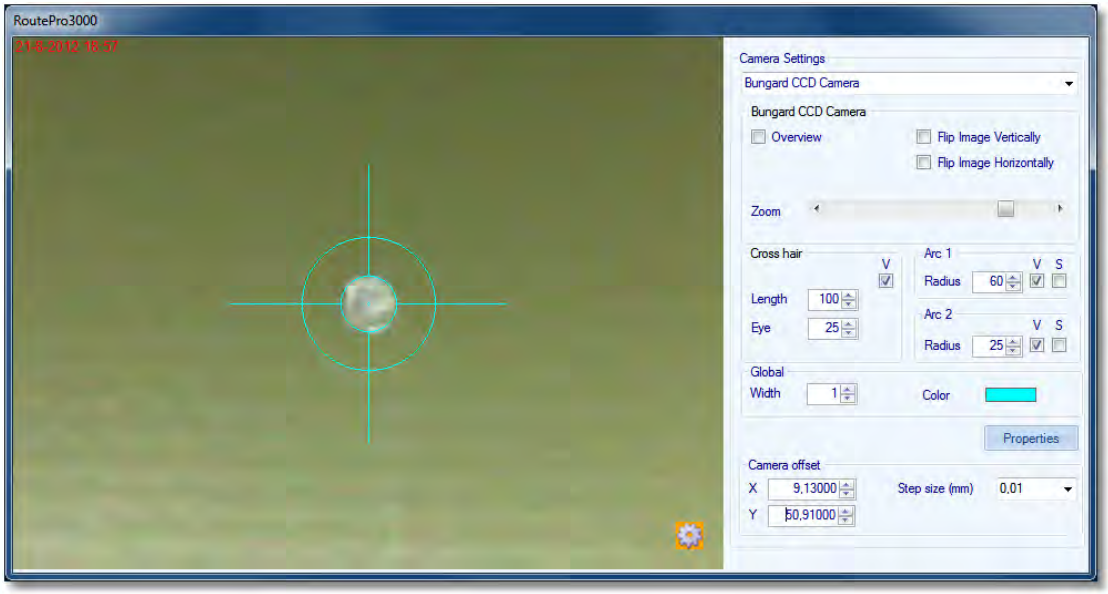
Note: *the value will be set as soon as you go to another field.*



Step 6

Now set the step size to 0,1 mm, and use the up/down buttons in the X,Y fields to move the camera until you are
nearly in the center, then set the step size to the smallest step: 0,01 mm and position exactly in the middle.

Note: *If the calibration unit is activated, you can use the zoom option for more accurate calibration.*



Step 7

Testing.
Switch of the camera, the head will move over the hole again. Switch the camera on, now the camera must be exactly over the hole.

Note: *the camera position (offset) is stored automaticly.*

This concludes the camera calibration tutorial.

4.5 How to use the calibration module

Using the calibration unit is very easy but you need to know a few basic principles.

Calibration is performed by using 2 points that are visible on your material.
These points will be automaticly calculated from the current data file.
If the current data file is an Excellon file (drill data), the lowest left hand hole, and the highest right hand hole will be used for calibration.

Note: *you could use the fixing hole file (if available) for this.*

In case you have a HPGL file (route data) the lowest left hand vector start point, and the highest right hand vector end point will be used for calibration.

Note: *A file with drill data is preferred for calibration, because it is easier to position the camera.*
Note: *Calibration effects all the layers in the project at the same time.*

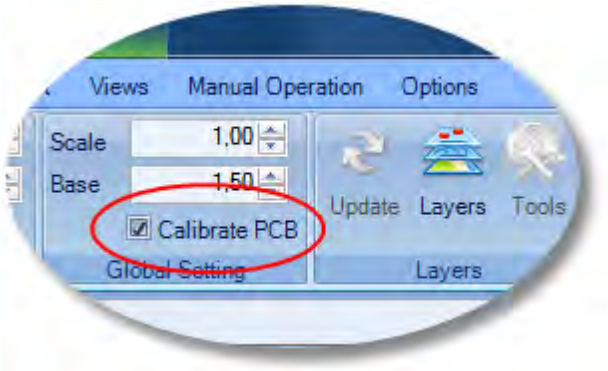
Because the camera has an offset from the spindle, it cannot reach approximately 6 centimeters in the Y direction.

Please keep this in mind while calibrating or using the camera as inspection device.

Requirements

Before you can use the Calibration module, the following items are required:

1. There must be a camera available and mounted on your machine.
2. The camera is calibrated.
3. Make sure you have the calibration unit enabled in the Installed Options.
4. Calibrate PCB must be checked in the General Tab under the Project Group.
5. The distance calibration for automatic fiducial centering has been performed.



Note: *This check-box will only be visible if you enabled the Calibration module under Installed Options.*

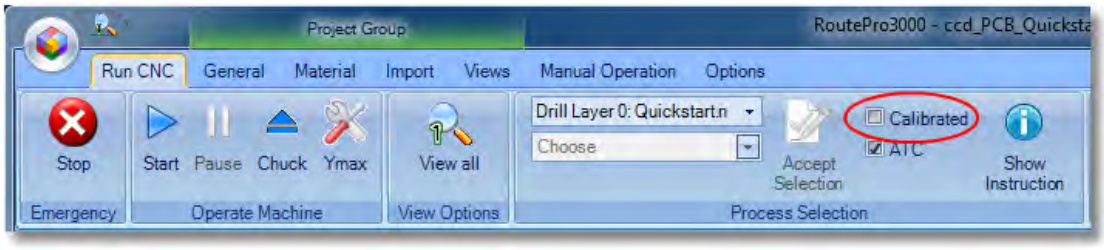
Step 1

For this tutorial we have drilled a board in the normal position and placed it after that under an angle on the table.
to be able to show you the power of the calibration module.

Open the Quickstart project.

Step 2

Click the Run CNC tab, you will notice a check-box under Process selection, named: **Design is Calibrated**.



Note: *it should be unchecked. If not: uncheck it now.*
Note: *If you check the box, the program assumes that the design is calibrated and therefore will skip calibration and start processing.*

Step 3

Press Start.
Now the following will happen:
1. The camera window will open.
2. In the viewer will show the first reference point marked.
3. The machine will travel near the reference point.
4. The Calibration tab, that is normally invisible, will open.

Step 4

Just position the square over the fiducial (drill hole) and click.
The camera will now move over the hole and automaticly centers it.
If it does not center correctly you might need to set the threshold to another value. (be careful not to hit the calibration button while setting the threshold)

Note: *All the buttons on the calibration tab, work the same as in the manual operation, except the green check button,*

pressing this will accept the current position and will move the camera near the next calibration point.
You might want to use the buttons if the result is not optimal due to bad lightning.

To abort the calibration press Cancel.

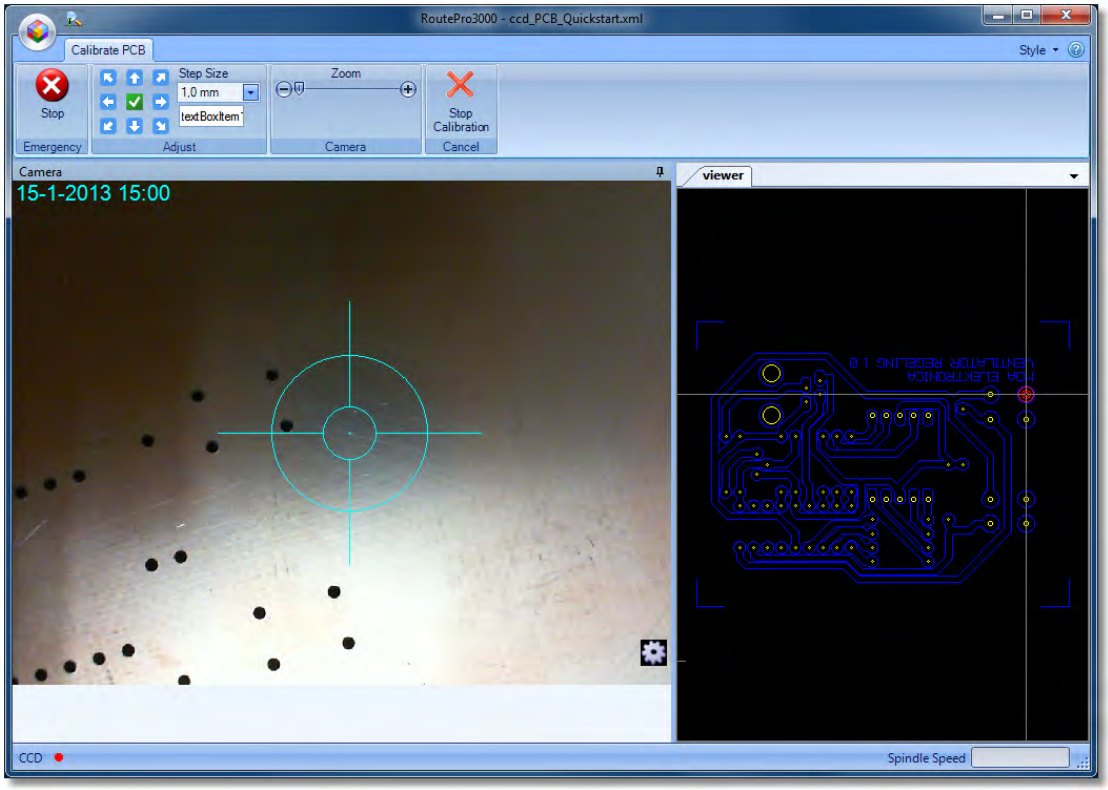
Note: *you may use the zoom to fine tune if needed.*

When you are satisfied press the green check button to accept the current position.

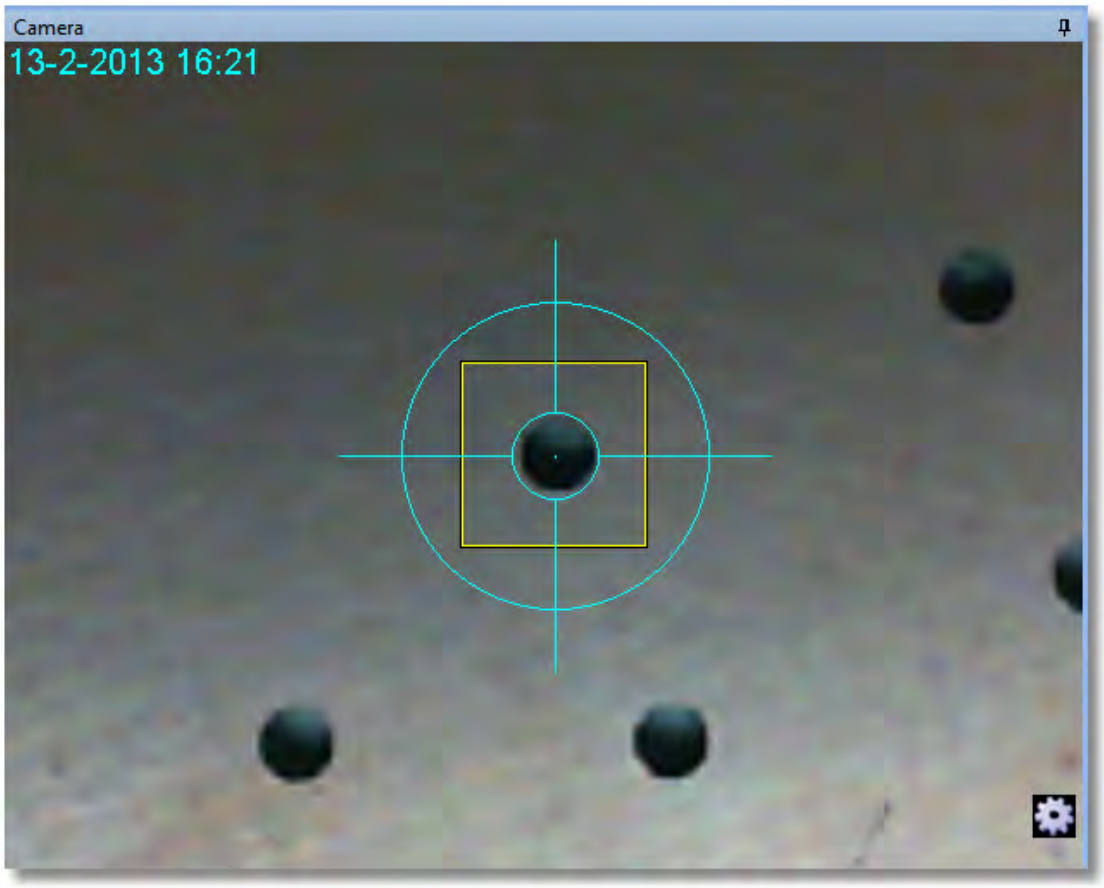
Step 5

We perform here exact the same as in step 4.

Note: *The zoom value is automaticly set back to be able to spot the second calibration point.*



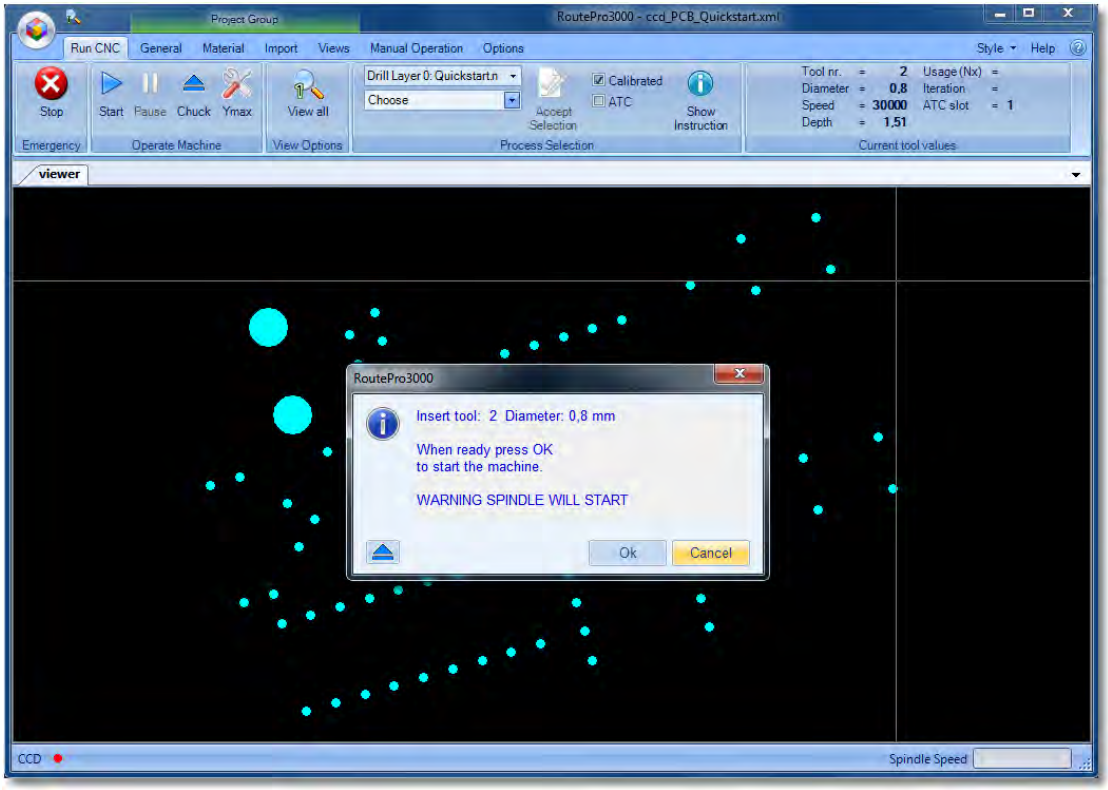
Note: *Always use step-size 0,01 for the final touch.*



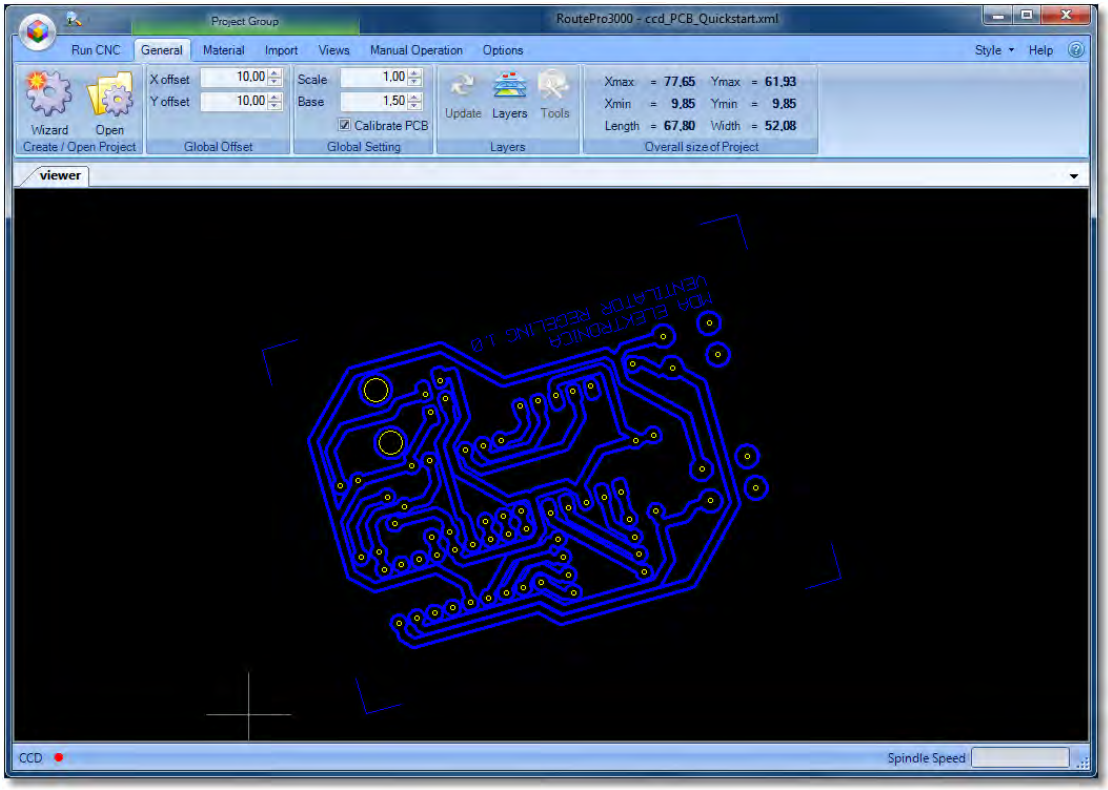
When you are satisfied press the green check button to accept the current position.

Step 5

All the layers of your project will now be adjusted and you may start processing.

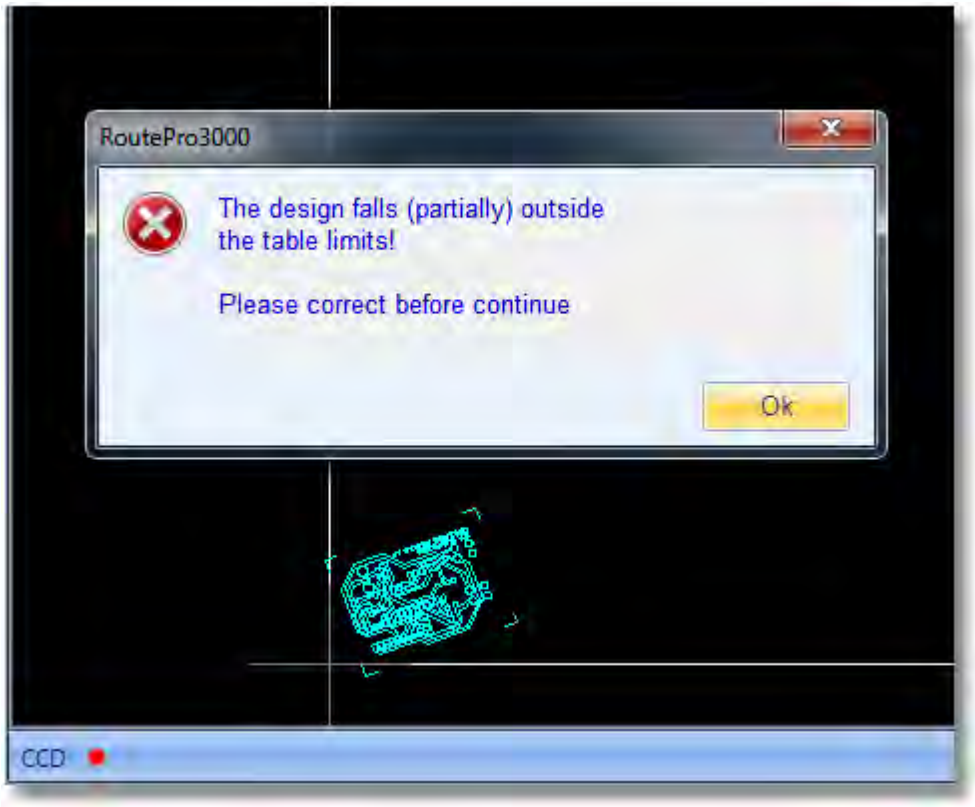


Note: *If, at this point, you would like to select different tools, you can cancel the window and do the data selection.*
The project stays calibrated as long as you do not change the project it self or reload the project.



Remark

If a design is calibrated, it is possible that some parts of other layers fall outside the table limits, in that case you need to place the material in a way that this is prevented.



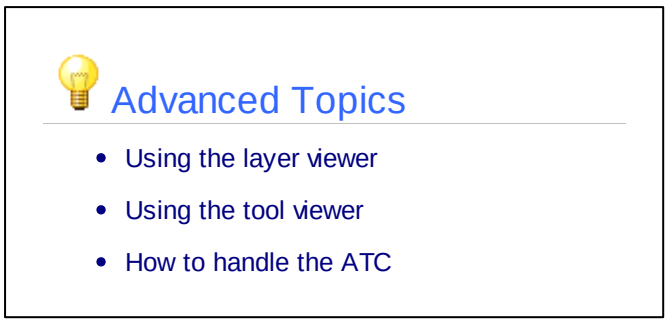
Note: *Just for demonstration purposes in this tutorial we have placed the board under an extreme angle,*
normally you should prevent that if it is not really necessary.

This concludes this tutorial.

Part V

5 Advanced topics

The chapters in this section describe functions and procedures that are more advanced.
And should be done by skilled engineers only.



5.1 Using the layer viewer

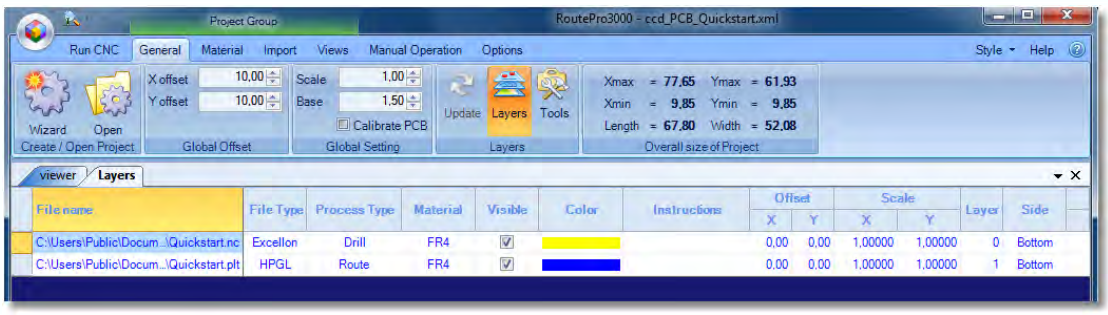
⚠ Changing parameters here should be done by skilled engineers. Wrong setting could end up in a project that is not working correctly anymore.
If that happens we suggest to delete the project and start all over using the Project Wizard again.

Projects are crated by using the Project Wizard to make things easy for you.
However sometimes you would like to change some parameters and this can be done using the Layer viewer.

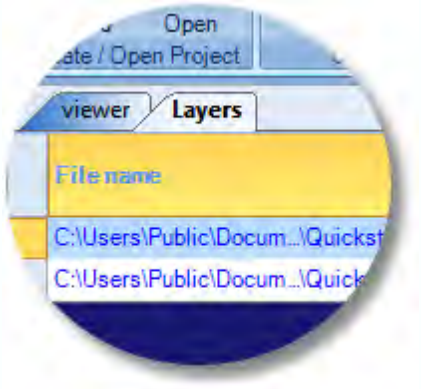
Press Layers in the General tab.

Now two things will happen:

1. It opens the layer table, here you see the data that has been loaded in the project.
2. On the right side of the Layers button, an extra button: **Tools** is now enabled.



At the bottom of the screen, the project name is shown and you see 2 tabs at the top of the window: **viewer** and **Layers**.



If you click the tabs, you can change the current view window.

In the layer screen you see the following fields:

- Material

  This is the overall material type used for this layer.

- Visible

  Shows or hides the layer.

- Color

  Here you may change the color of the layer
  Note: *A drill layer is always yellow, you cannot set a different color.*

- Instructions

  Type or change here the instructions for this layer

- Offset

  The offset here is used to synchronize the layers, only needed if the offsets are different.

  Note: *The best practice is to set the offsets correct while producing the data files from you design program.*

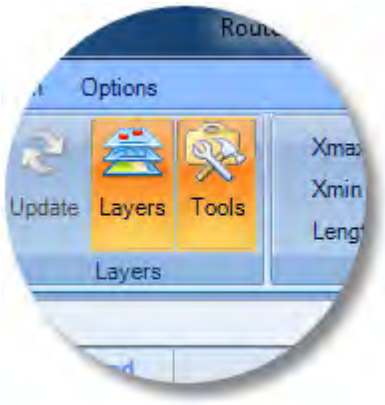
- Side

  Select here the side for the current layer, this has no influence on the processing in the standard RoutePro3000
  While using the RoutePro3000Extra version, it will be used to inform the user when to turn over the board in case of a double sided PCB

5.2 Using the tool viewer

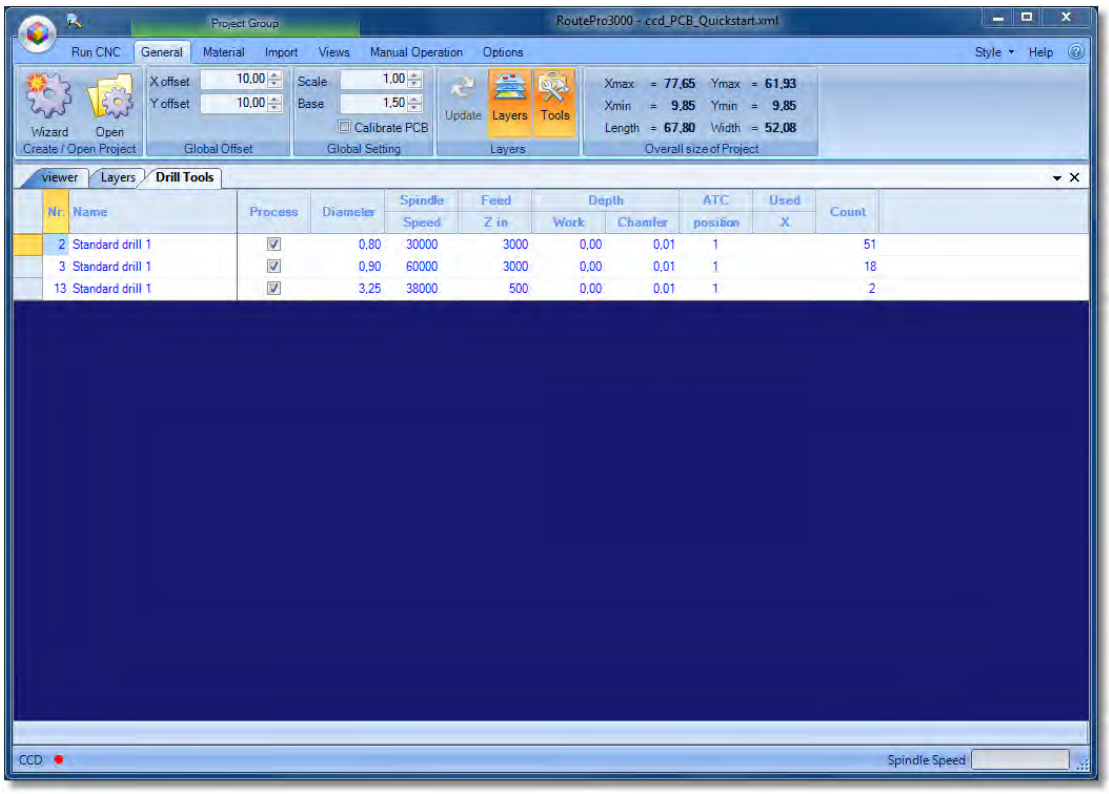
⚠ Changing parameters here should be done by skilled engineers. Wrong setting could end up in a project that is not working correctly anymore.
If that happens we suggest to delete the project and start all over using the Project Wizard again.

Each layer has it's own tool table, to open a tool table, you need first to open the layer table. (see using the layer viewer)
Select a layer and then press the Tools Button.



The tool window will be displayed, depending on the processing type, parameters can differ.

▾Open to show a Drill Tool window



The following fields are available.

▾Name

You can select a different type of tool here.

Note: *Changing the tool does not influence the project processing. i.e. it does not change the tool parameters accordingly.*

- Process

  Used to select tools for processing, this is done when you are in the selection mode under the Run CNC tab. read more....

- Diameter

  Here you can set the tool diameter.

  Note: *The tool diameter does not influence the behavior of the machine, it's an indication for the user and it's used to display the tools in the correct scale in the viewer.*

- Spindle Speed

  Select here the desired speed for the spindle.

- Feed Z in (Cutting feed)

  This determines the speed at which the drill will lower into the board.
  Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height (Z free), from there it uses the Cutting feed..*

- Depth Work

  Here you can define the drill depth.
  Note: *If you leave this field on 0,00 the drill depth is calculated automaticly, using the thickness of the used material.*

- Depth Chamfer

  
  This defines the extra depth you need to drill the hole completely.
  The picture shows you the chamfer.

- ATC position

  This parameter instructs the Automatic Tool Changer, where to find the current tool.

- Used X

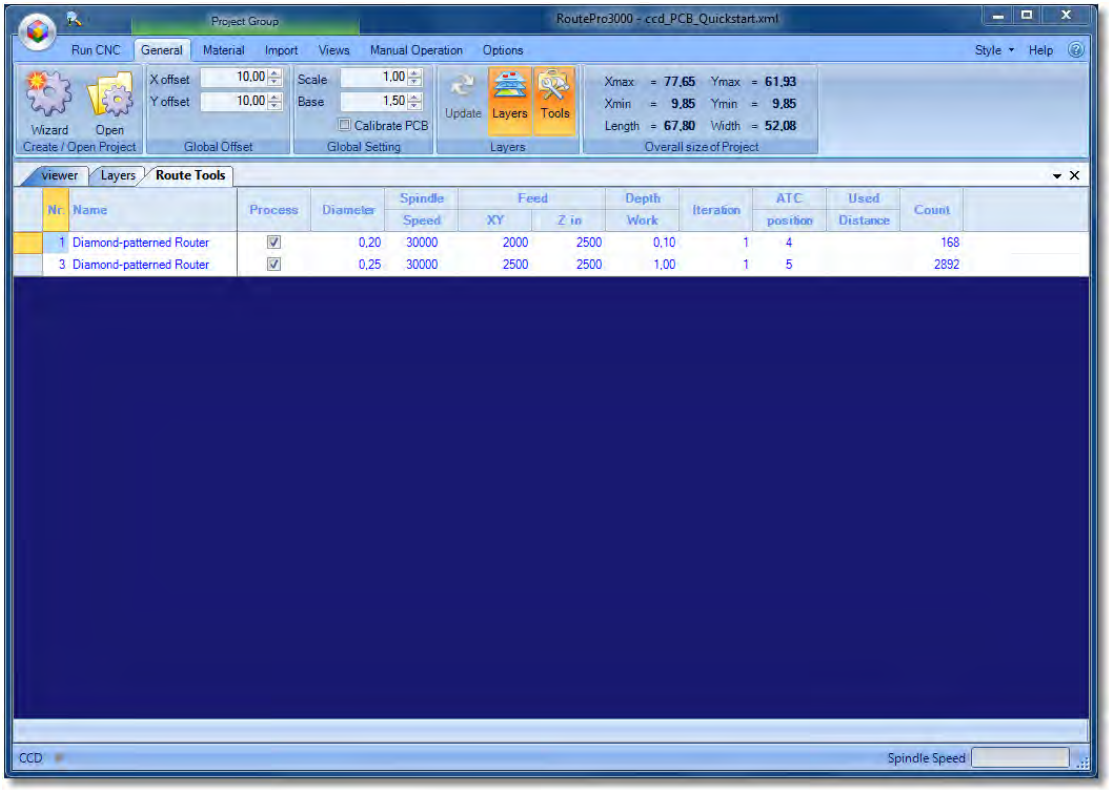
  This indicates the number of times the tool has been used.

  Note: You may clear this field by clicking it.

- Count

Indicates the number of drill coordinates for this tool.

- Open to show a Route Tool window


Project Group
RoutePro3000 - ccd_PCB_Quickstart.xml
Run CNC
General
Material
Import
Views
Manual Operation
Options
Style
Help
Wizard
Open
Create / Open Project
X offset 10,00
Y offset 10,00
Global Offset
Scale 1,00
Base 1,50
Calibrate PCB
Global Setting
Update
Layers
Tools
Layers
Xmax = 77,65 Ymax = 61,93
Xmin = 9,85 Ymin = 9,85
Length = 67,80 Width = 52,08
Overall size of Project
Viewer
Layers
Route Tools
Nr Name Process Diameter Spindle Speed Feed XY Feed Z in Depth Work Iteration ATC position Used Distance Count
1 Diamond-patterned Router 0,20 30000 2000 2500 0,10 1 4 168
3 Diamond-patterned Router 0,25 30000 2500 2500 1,00 1 5 2892
CCD
Spindle Speed

The following fields are available.

- Name

  You can select a different type of tool here.

  Note: *Changing the tool does not influence the project processing. i.e. it does not change the tool parameters accordingly.*

- Process

  Used to select tools for processing, this is done when you are in the selection mode under the Run CNC tab. read more....

- Diameter

  Here you can set the tool diameter.

  Note: *The tool diameter does not influence the behavior of the machine, it's an indication for the user and it's used to display the tools in the correct scale in the viewer.*

- Spindle Speed

  Select here the desired speed for the spindle.

- Feed XY (table feed)

  This determines the speed that will be used while the tool is actually milling, the lower the speed the higher the result.
  Note: *If the tool is raised the highest speed setting will be used to travel to the next location..*

- Feed Z in (Cutting feed)

  This determines the speed at which the drill will lower into the board.
  Note: *When the drill is completely up, it will be lowered at a high speed until it reaches the fly height (Z free), from there it uses the Cutting feed..*

- Depth Work

  Here you can define the Route depth.

- Iteration

  If this parameter is greater then 1, milling will be done in multiple steps.
  Example: requested depth = 3 mm, Iteration = 3 The first milling action will have a depth of 1 mm the next depth will be 2 mm etc.

- ATC position

  This parameter instructs the Automatic Tool Changer, where to find the current tool.

- Used Distance

  This indicates the distance the tool has traveled.

  Note: You may clear this field by clicking it.

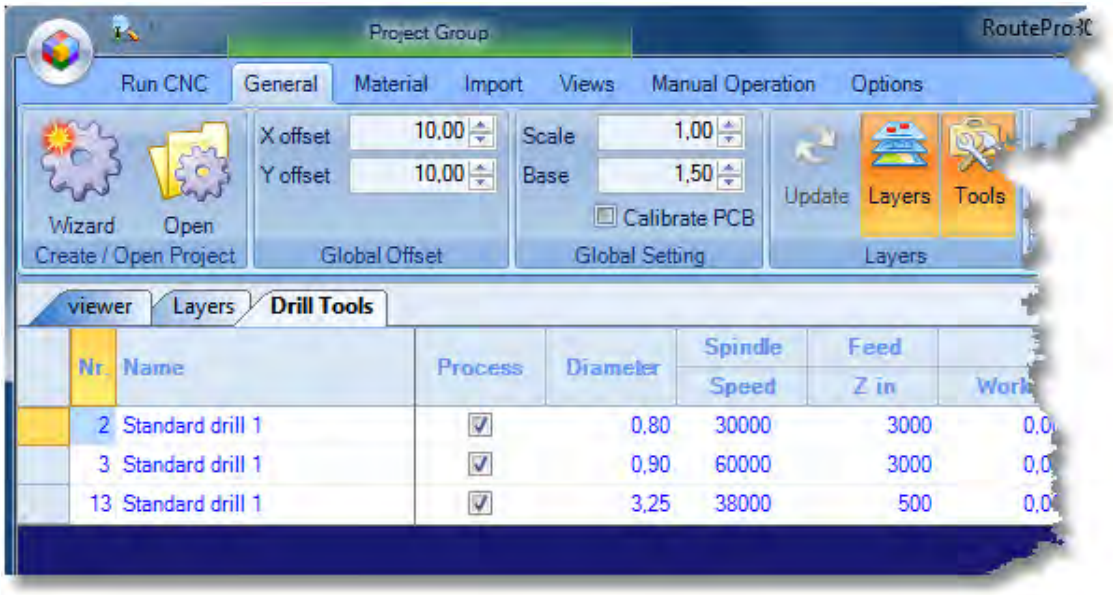
- Count

Indicates the number of vectors for this tool.

- Changing the processing order of the Tools

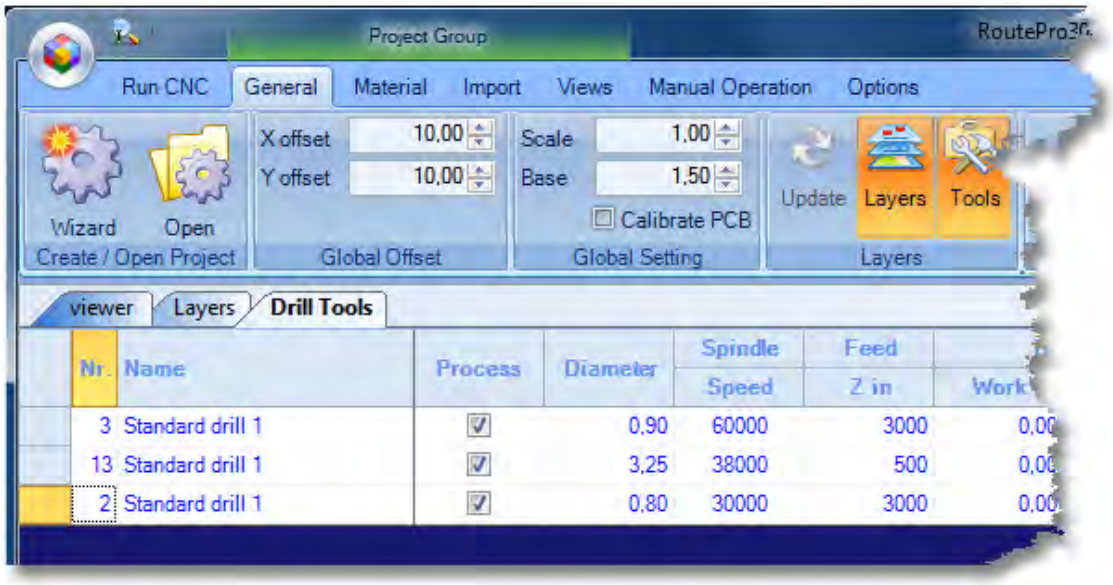
Sometimes it is necessary to change the processing order of the tools, below we show you how

to do this.



This is how your screen looks before the tool order is changed.
The order of processing will be: tool 2, 3, and 13.

Now click with the left mouse button on the very first field of the tool, you would like to move in the list,
hold the button while dragging the tool to the desired position.

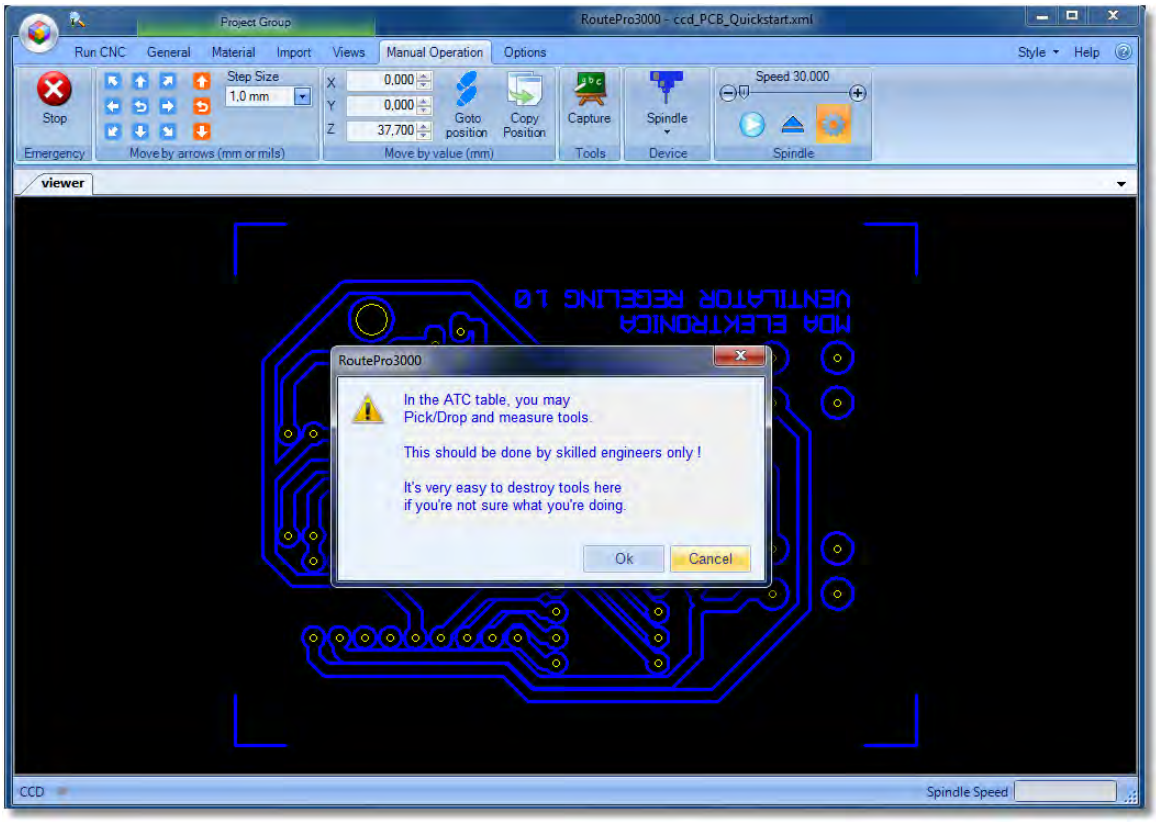


We have dragged tool 2 to the bottom of the list.
Now the order of processing will be: tool 3, 13 and 2.

Note: *The same applies for the Layers however changing the layer order is only useful in RoutePro3000Extra while running an automation script.*

5.3 How to handle the ATC

Please be careful, managing the tools using the ATC table should only be done by skilled engineers!
It is very easy to destroy or damage the machine if you are not careful.

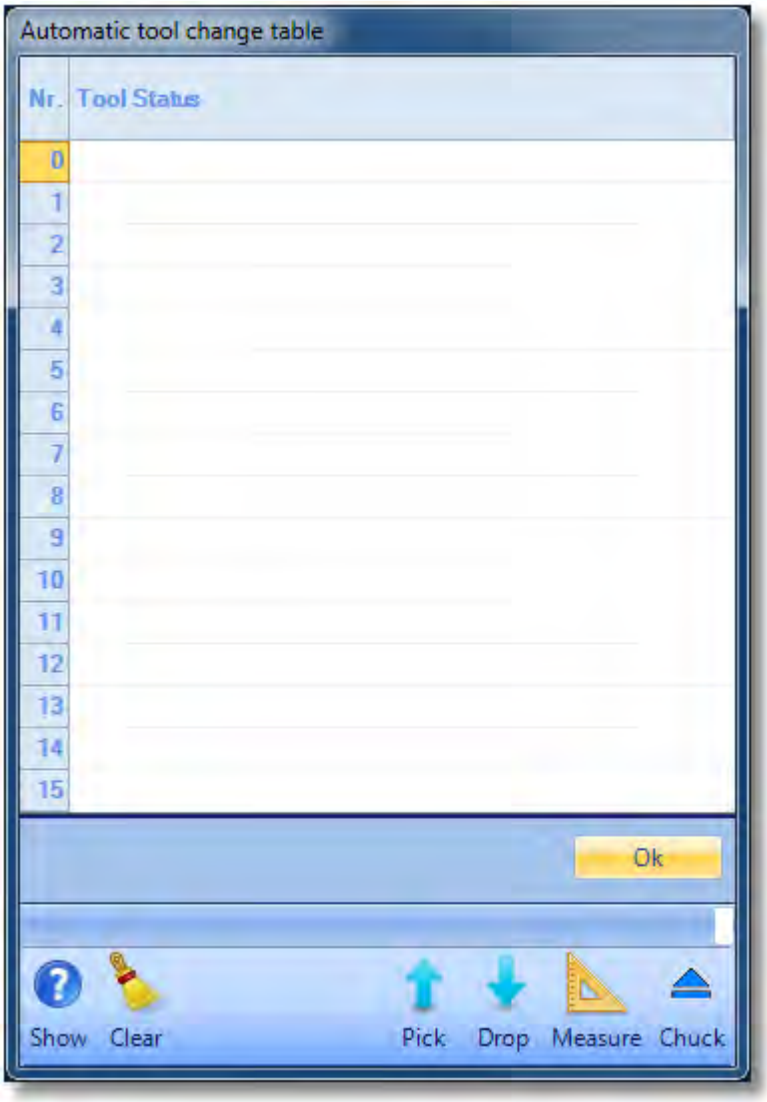


When you press the ATC button, the first thing you will see is the warning screen.

If you are not a skilled engineer, please press Cancel now.
It is very easy to destroy tools or damage the machine if you are not careful.

- OK, you read the warnings, so we can continue

  The next screen will appear:



▾Nr.

The number correspondents with the Tool slot on the machine.

Note: *Slot number 0 is used to store the Test Tool and cannot be used for other purposes.*

▾Tool status

Here you will see the status of the tools, it will also show the measured length of the tool.

There are 4 different messages:

- Tool OK 21,06 mm
- Tool to Short 18,00 mm
- Tool to Long 22,05 mm

- No tool found or broken

Note: *the correct length of the tool should be 21,00 mm, measured from the top of the ring to the point of the tool.*

▾OK

Closes the ATC table window.

▾Help

When pressed, the tool tips in the table are shown.

▾Clear

Clears al the status messages in the table.

▾Pick tool


Before you use this button, make sure that the **spindle has no tool inserted**!

First select a tool in the table, then press the button to pick the tool.

▾Drop tool


Before you use this button, make sure that the **selected tool slot has no tool inserted!**

First select a tool in the table, then press the button to pick the tool.

▾Measure tool

Measure the current tool, the status will be displayed in the table.

▾Chuck

Opens or closes the chuck

Part VI

6 License system

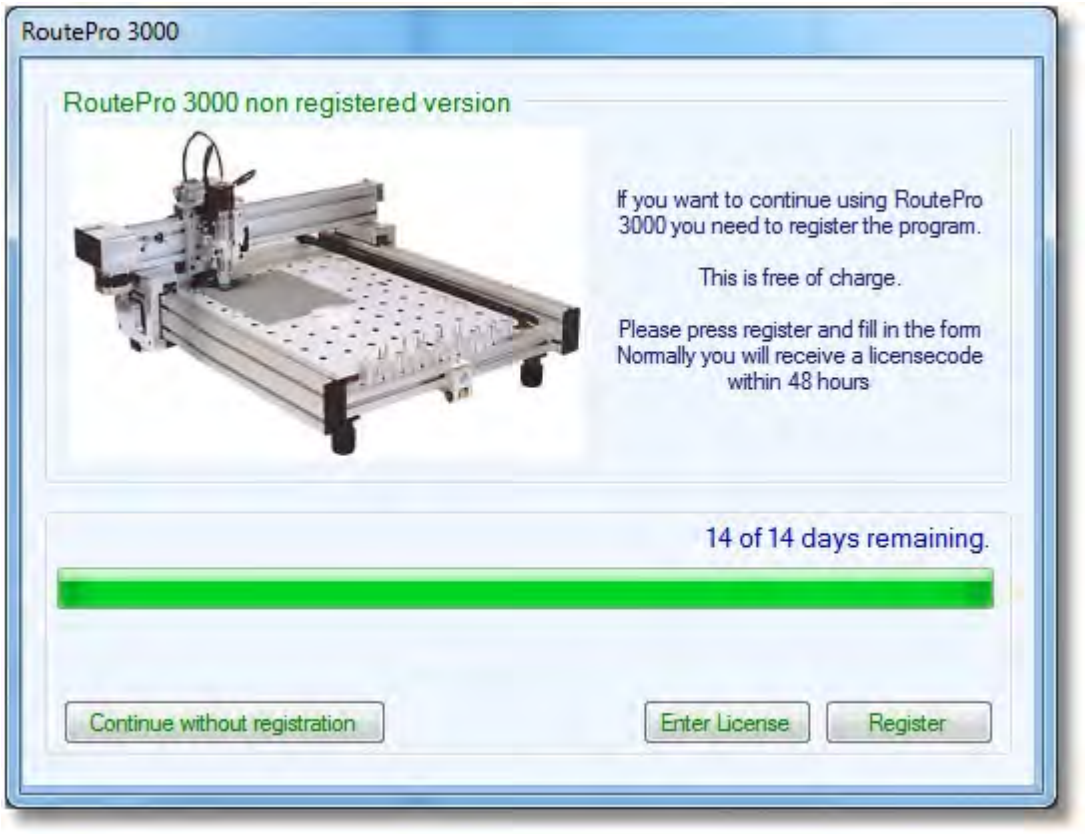
The chapters in this section describe how to activate / deactivate licenses.

License system

- Activating RoutePro3000
- Activating a module
- Deactivating RoutePro3000

6.1 License system Activation

When you start RoutePro3000 for the first time you will see the next screen:



You have 3 options here:

▾Continue without registration

You may use RoutePro3000 during the evaluation period without activation.

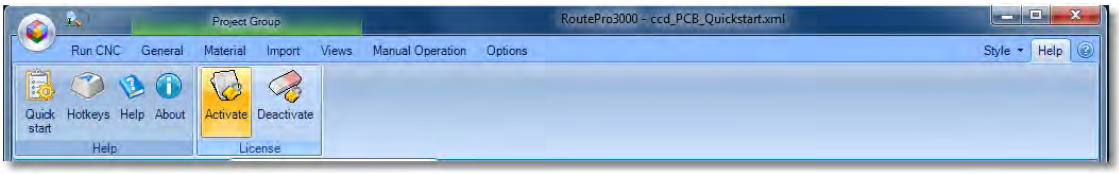
After the evaluation period has expired you need to activate RoutePro3000 to continue working.
Please note:
We advise you not to wait with your registration / activation until the period is expired because It can take up
some time before you receive your activation code and during this time you can't use RoutePro3000.

For Quick start: continue with Find CCD machine

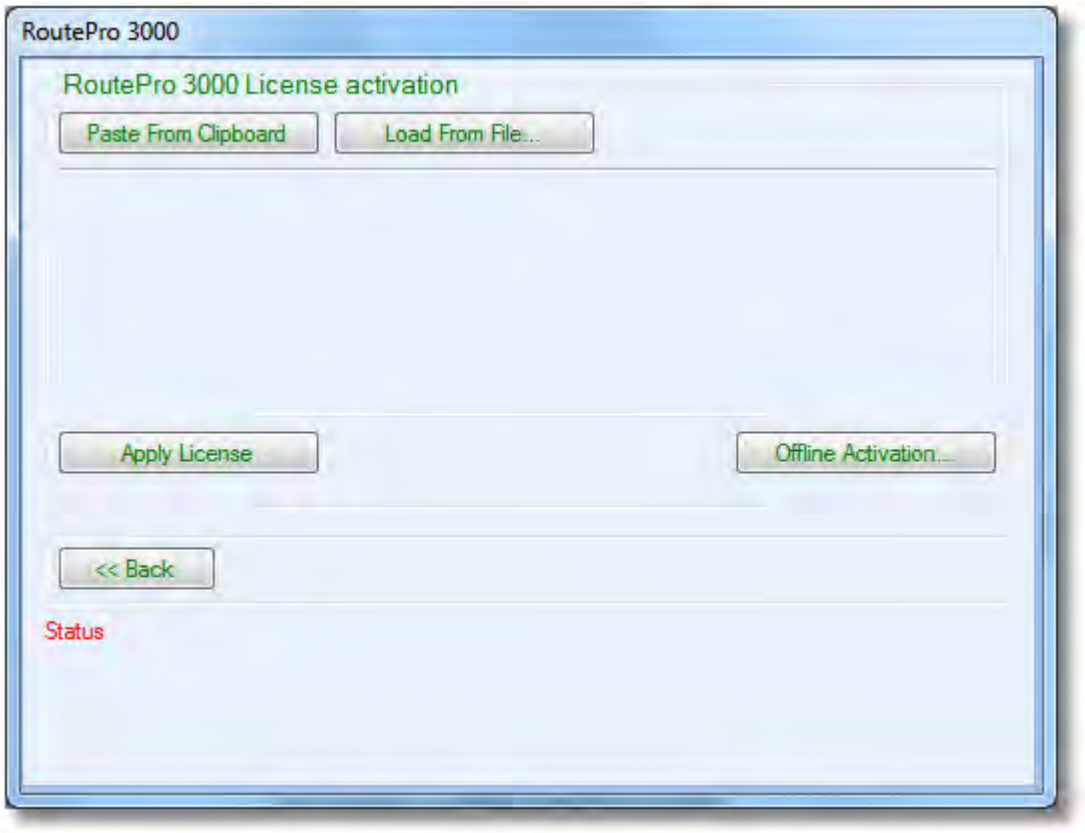
▾Enter License

If you have received a license file by email you may use the following procedure to activate it.
Start RoutePro3000 to start the license manager.

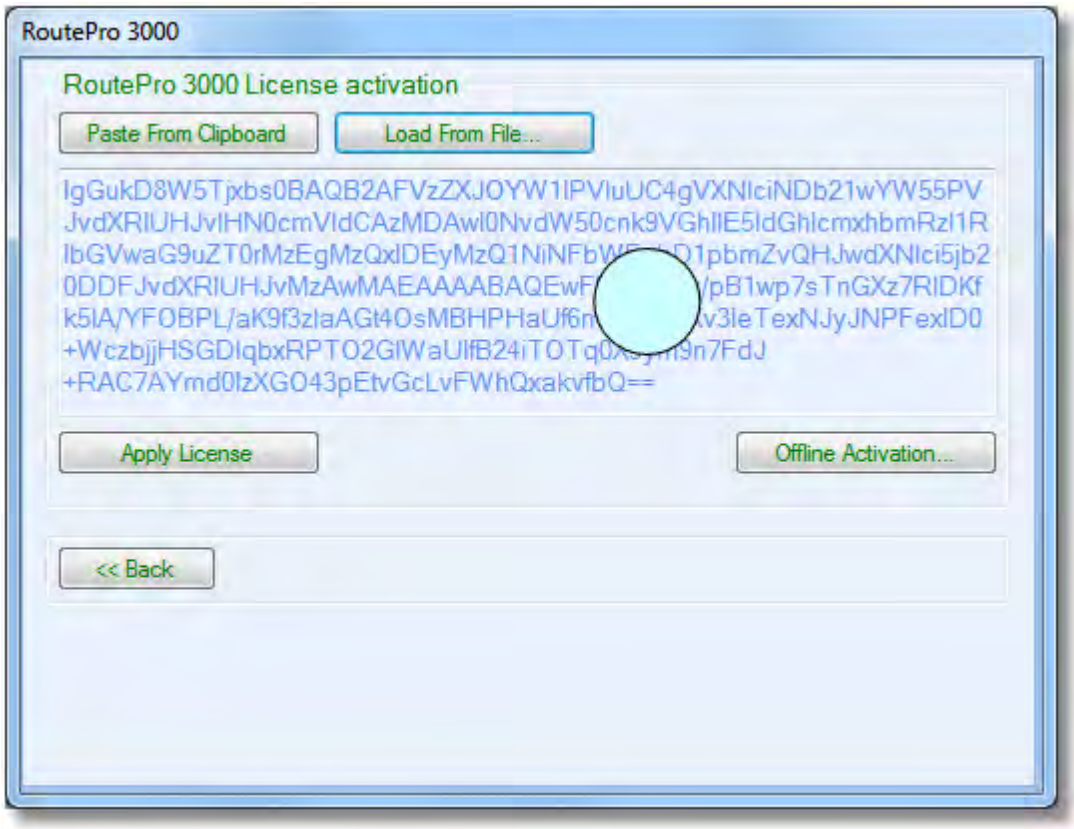
▼If RoutePro3000 is already running you may press the Activate button on the ribbon bar to start the License manager



Press in the main license screen: Enter License, the following screen will appear:



Press Load from file, the file selection window opens, select the license file and press Enter.
The file name looks like: *RoutePro3000 12986053193627995 06-07-2012.lic* The gray area will be different per license.
The license data will be loaded into the screen automaticly.



Now press Apply License, checking will take a few moments, if the license is accepted the following screen will be showed.

As you can see the license has been personalized to you.
You may now enter a module license or press OK to start the program.

For Quick start: continue with Find CCD machine

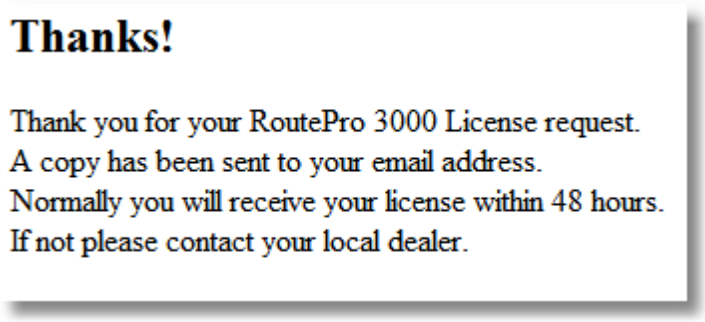
▾Register

Before you can activate your copy of RoutePro3000 you need a license.
You can request a license by pressing the Register button.
Your browser will open and the next screen will appear:

It is important that you fill in all the required fields. (The Comments field is not required.)
Enter the code (this is to prevent misuse) and press Submit Message.

An email with your request will be send to us and you will receive a copy.

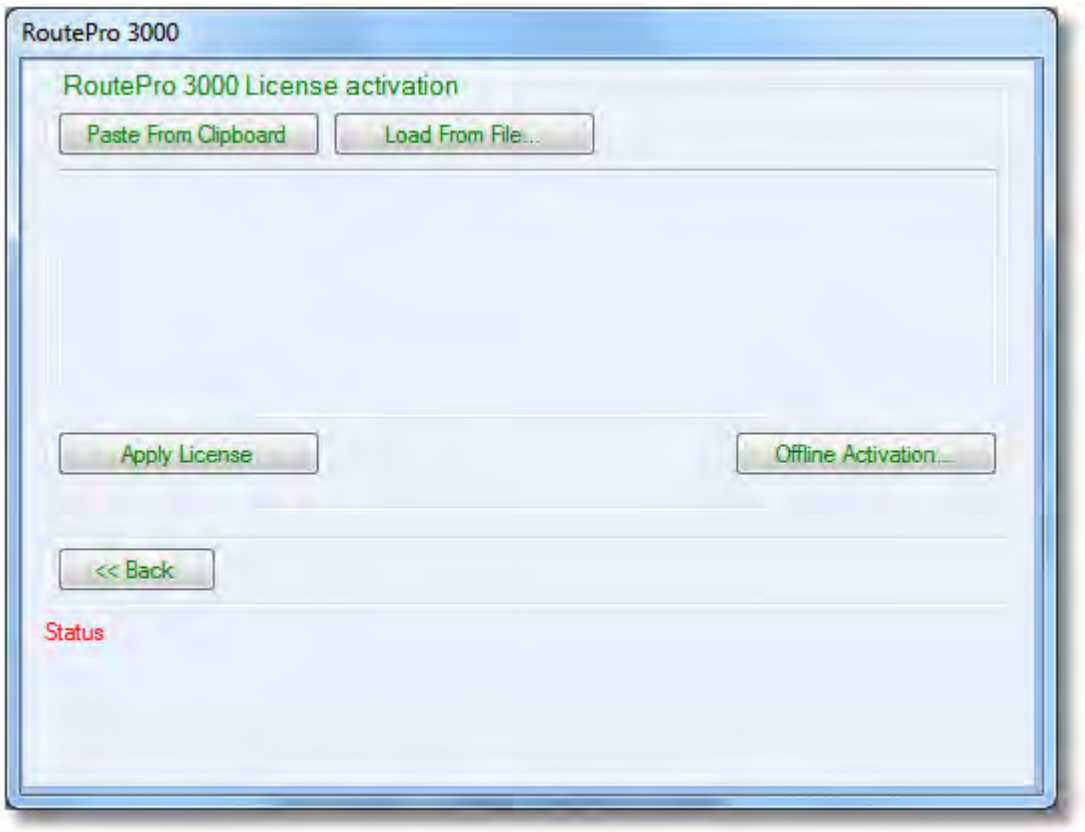
On success, you will get the following response.



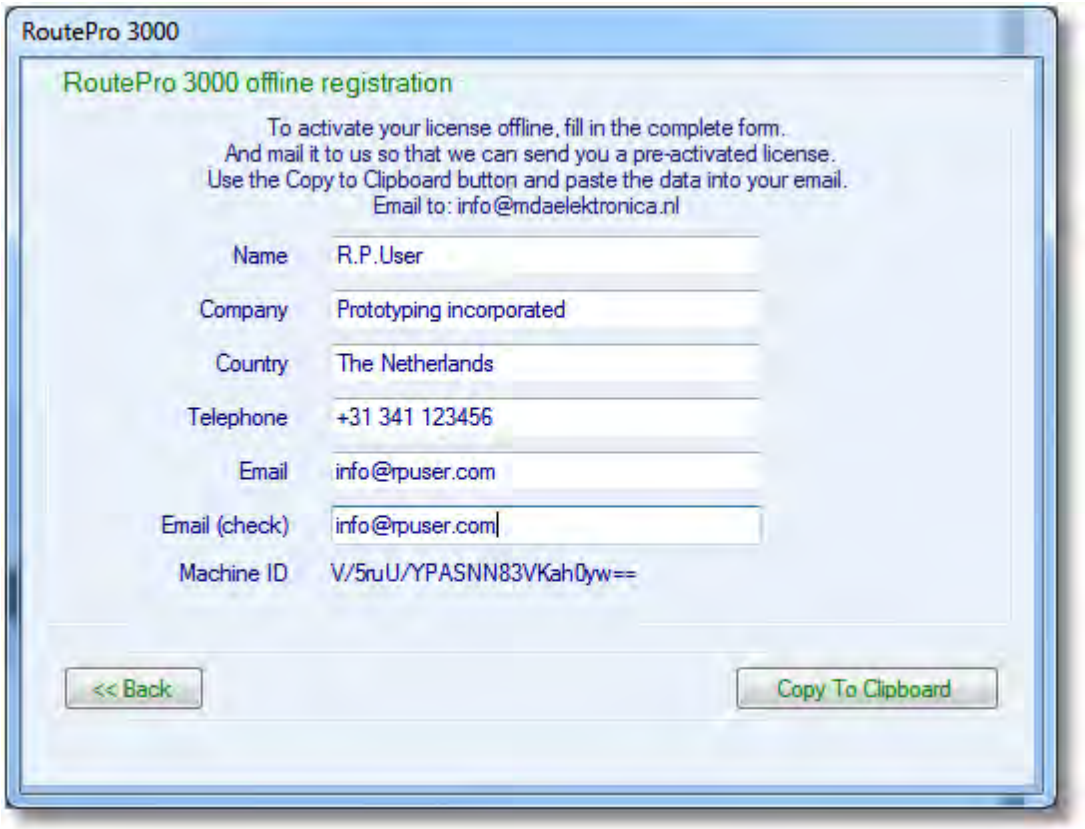
After you have received your license, use the Enter License button to activate it.

▾Offline registration / activation

If your machine is not connected to the Internet you can register / activate RoutePro3000 offline. However we do not recommend this, because the process takes more time.
And if you want to move the license to another computer you need to create an email with the deactivation details, send it to us and wait for a new license. During this time you cannot use RoutePro3000.
Another solution could be to connect the computer temporary to the internet for registration / activation.
If you choose to do the registration offline, you should install RoutPro3000 on the offline computer first,
run the program and in the License screen press Enter License, you will see the next screen:



Now press Offline Activation, the next screen will be displayed:



To request your license offline, fill in the complete form.
And mail it to us so that we can send you a machine locked license.
Use the Copy to Clipboard button and paste the data into your email.
Email to: info@mdaelektronica.nl

▾The data will look like this:

RoutePro 3000 offline license request

** Do not change the data below **

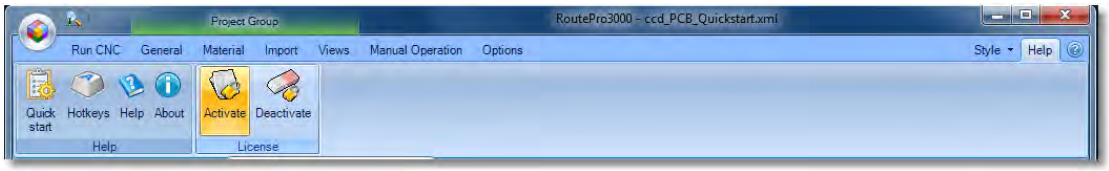
Field0=R.P.User
Field1=Prototyping incorporated
Field2=The Netherlands
Field3=+31 341 123456
Field4=info@rpuser.com
Field5=V/5ruU/YPASNN83VKah0yw==
Field6=dinsdag 31 juli 2012 16:16:04

Please note: *the license is machine locked, this means: it checks the machine ID and will only work on the machine you have created the request form on.*
After you have received your license, use the Enter License button to activate it.

6.2 License system modules Activation

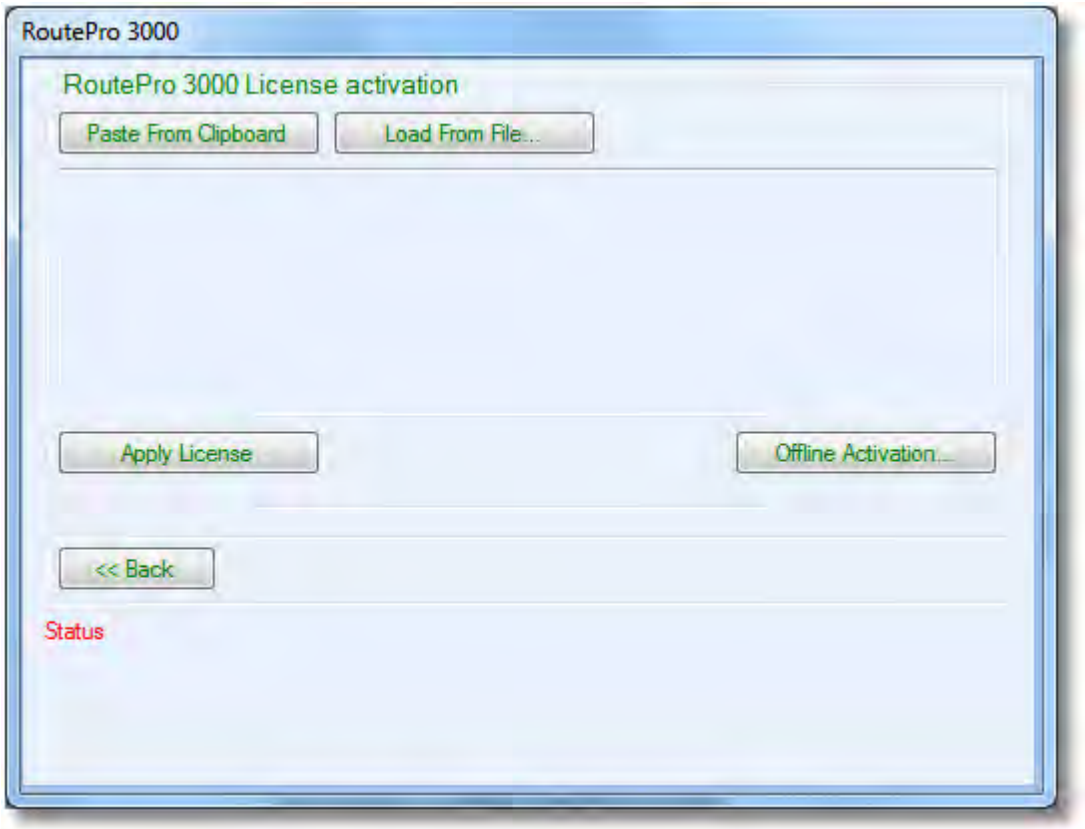
After you are registered / activated RoutePro3000 you may activate module licenses.

To activate license module(s) press the Activate button in the Ribbon bar under the Help tab. (as example we use the Calibration license)

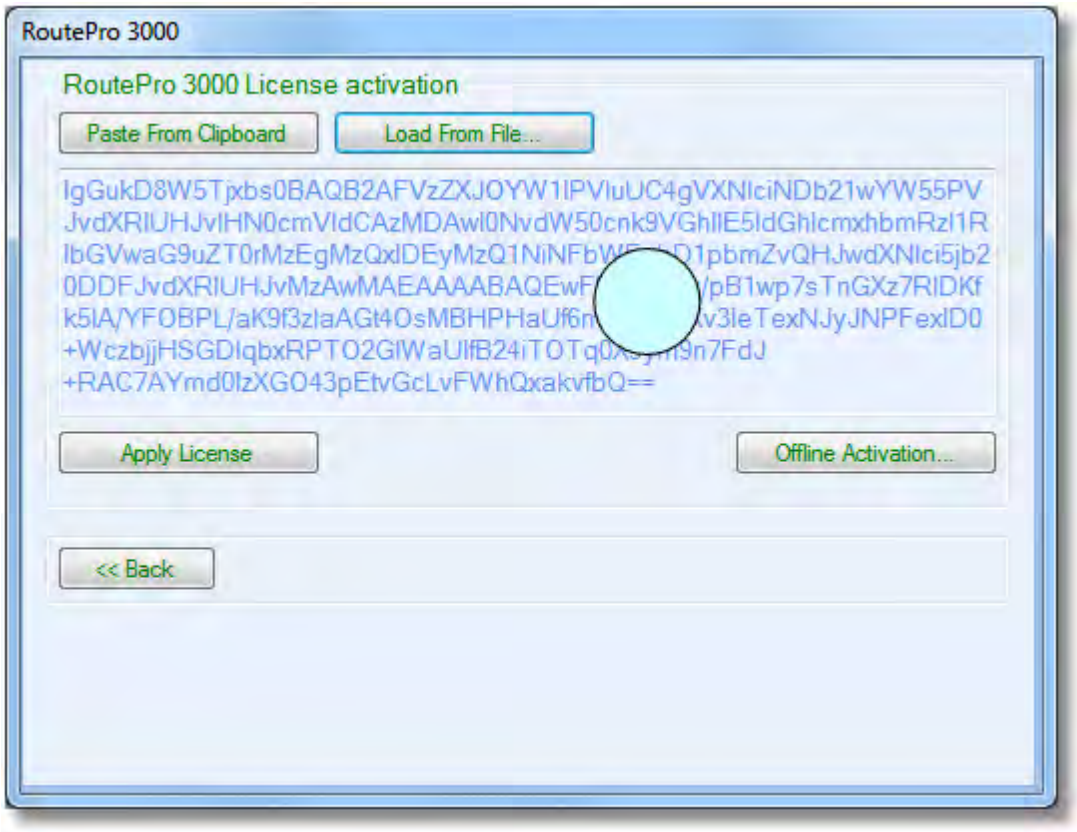


the following window will appear:

Press Enter License, the following screen will appear:



Press Load from file, the file selection window opens, select the license file and press Enter.
The file name looks like: *PCBCalibrate 12986053193627995 06-07-2012.lic* The gray area will be different per license.
The license data will be loaded into the screen automaticly.



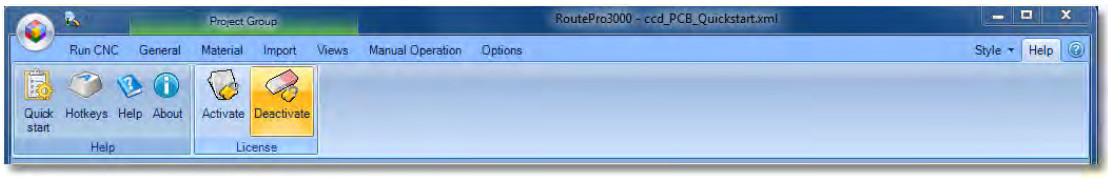
Now press Apply License, checking will take a few moments, if the license is accepted the following screen will be showed.

As you can see the license has been added to the list..
You may now enter the next module license or press OK to start the program.

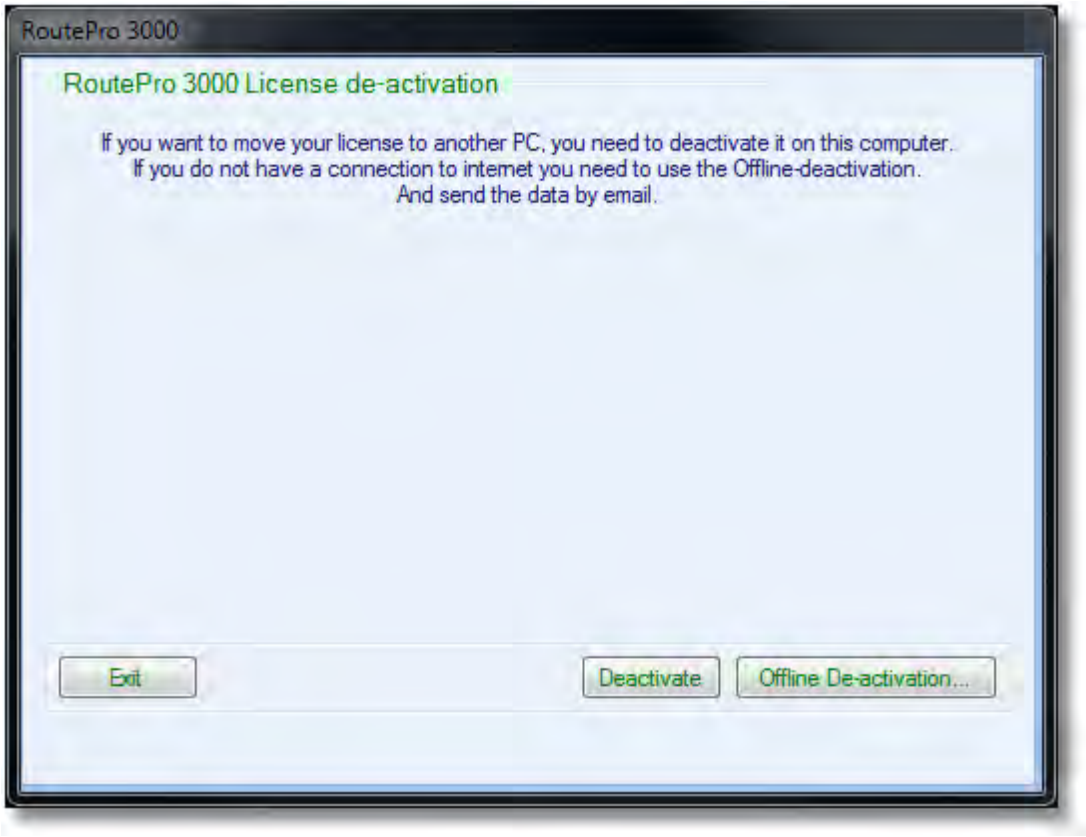
6.3 License system Deactivation

In case you need to switch from one computer to another you need to deactivate the licenses first on the old computer before you can use them on the new one.

Press the Deactivate button in the Ribbon bar under the Help tab.



then the following screen appears:



You can then press Deactivate a warning will appear if you are sure.
Pressing OK will deactivate all the licenses.
After that RoutePro3000 will close.
Now you can activate your licenses on a different computer.

Please note that registration is not needed again because all the user details are embedded in the license.

▾Offline deactivation

Only use this when you have activated your licenses offline.
Click the Offline Deactivation button and follow the instructions on the screen.
Send an email with the deactivation details to us and wait for a new license.
Please Note: In the mean time you can't use RoutePro3000.

Part VII

7 Reference

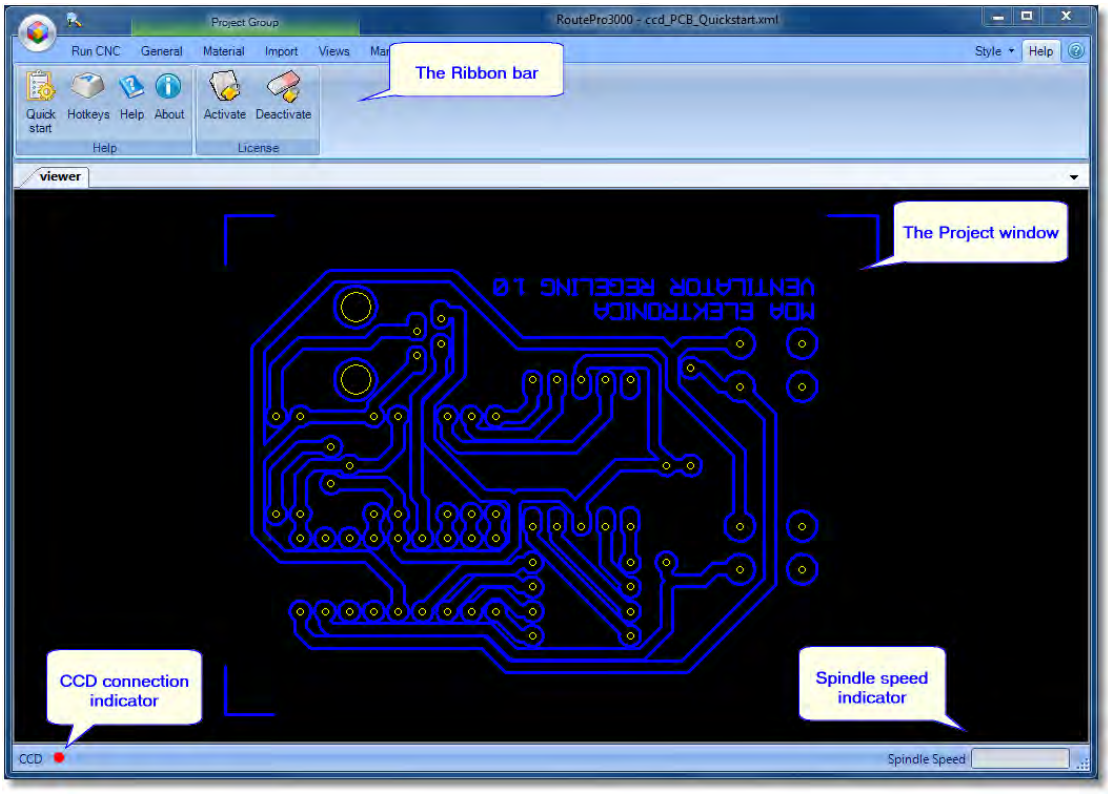
This section contains documentation of all RoutePro3000's menu options and the associated dialogs

The other sections in Reference contain more detailed background information on a number of key subjects that will help
you to gain a better understanding of how RoutePro3000 works. Studying these sections is not absolutely essential
but it will make it much easier for you to use RoutePro3000 efficiently and effectively.

There are extensive cross-references and links to the Procedures sections so that you can always find the instructions
you need to show you how to do what is being described in the reference topics.

7.1 The User Interface

The RoutePro3000 window has two main components: The Ribbon Toolbar and Viewer.



The RoutePro3000 user interface

The Ribbon Toolbar

RoutePro3000's functions are accessed primarily through the Ribbon Toolbar (or Ribbon for short).
It is divided into tabs that group functions according to tasks

Click on a tab to go to the description.

The Qat bar

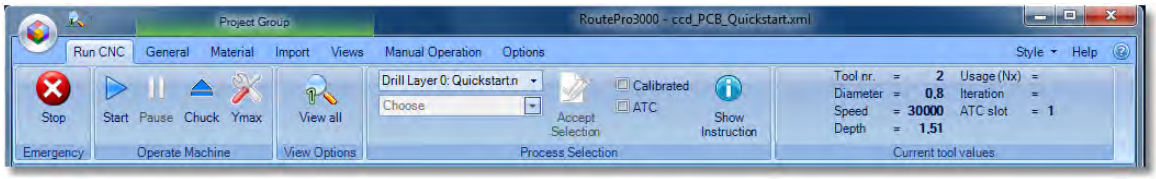
Here you find a global View-All button.

The Viewer

The Viewer is used to display and select the data on the screen.
Several other windows, like tool windows, will be docked here when opened.

7.1.1 Run CNC

The Ribbon tab Run CNC is used for the actual processing of the data.



Click on a button or field for a description (some buttons or fields are only available if the required module is enabled)

Emergency Stop

When the machine is running, hitting this button will interrupt the process by stopping the spindle and disabling the motors.
The position in the data list that was currently processed will be preserved so starting the machine will continue where it was stopped
When the machine is started again, it will go first through the initialization before continue, this is because all the motors were disabled.

Note: *if the emergency is used while the ATC is active and you press start again, the question for the correct placement of the tools is asked again.*
you need to place all tools in the appropriate slots and place the test tool in the chuck again.

 **ESC**

Operate machine

Start

Start the machine. The selected data will be processed.

Pause

When the machine is running, hitting this button will finish the current vector or drill hole and then pauses the process.
The position in the data list that was currently processed will be preserved so starting the machine will continue where it was stopped
When the machine is started again, it will go not go through the initialization first, because the motors are still enabled.

▾Chuck

Opens and closes the spindle chuck.

Note: *Only visible if the ATC option is installed.*

▾Ymax

When pressed it will move the head to the Maximum Y position for easy access of the board.

Note: *If Ymax is used, the motors stay enabled during all processing of the layers.*

View all

Zooms all the data within the Viewer

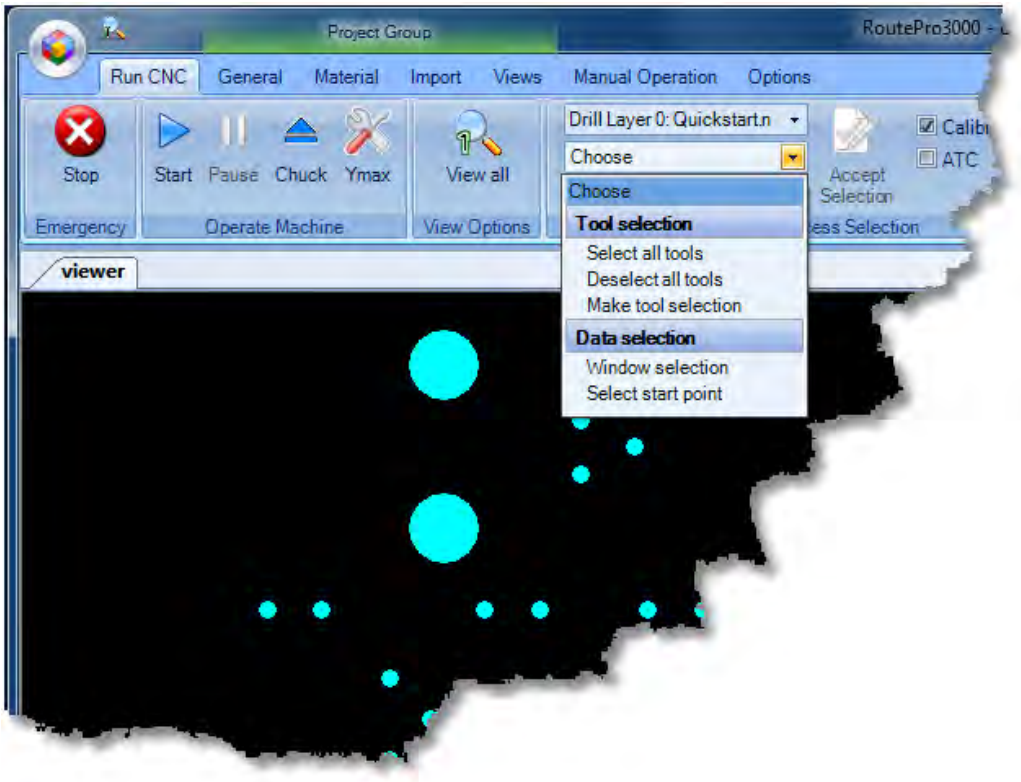
Process Selection

Process Layer Select

This drop-down box hold the process layers, you may select a layer for processing. Only the data for the current layer to process will be shown.

Data Select

By default all the data will be selected for processing.
By clicking this drop-down box you have several options for selecting data.



Click on the drop-down box for a description

Tool selection

Select all tools

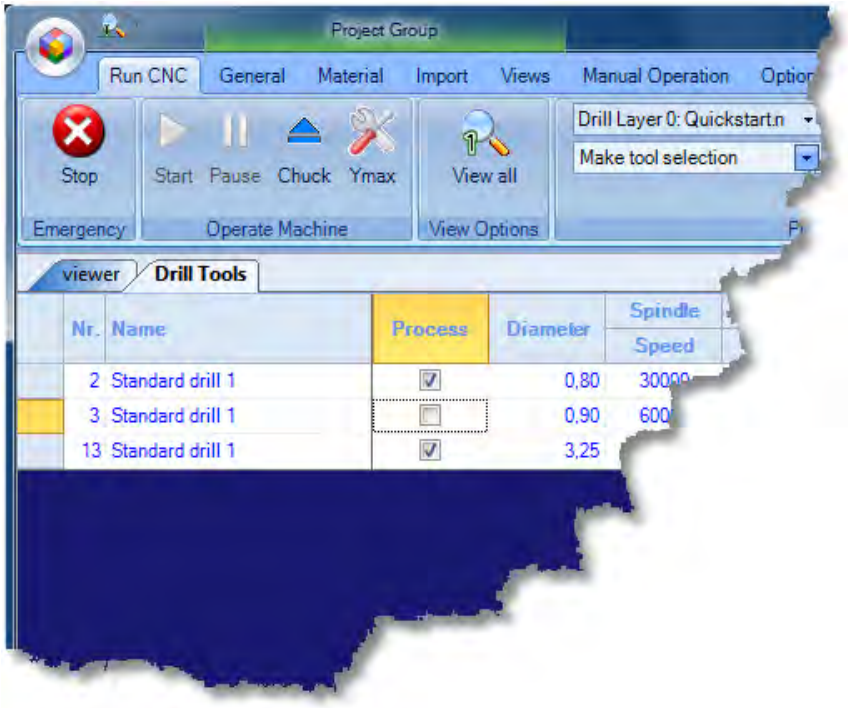
All the tools available for this layer will be selected.

Deselect all tools

All the tools available for this layer will be deselected.

Make tool selection

You can select or deselect the tools in the tool table as shown.
The Accept Selection button will be enabled, you need to press this when finished.



The tool window is a docking type of window, you may undock it by holding the mouse pointer
on the tab at the bottom and drag the window to another place. Now you can have both windows in view.

Select data

Window selection

If you need to select one or more data items, you can use the window selection.
Select the items by drawing a window around them or by clicking them.
Holding the shift key while selecting enables you to add more items.

The Accept Selection button will be enabled, you need to press this when fin-

ished.

Select start point

This feature is very handy when your tool did not perform correct on a part of your design.
Just replace the tool and select the last item that was processed correctly.
All the data items that follows will be enabled as soon as you press the Accept Selection button.

Accept Selection

You need to press this button to accept the selections you have made in: Make Tool , Window and Startpoint Selection.

Show Instruction

This is a toggle button and it will show a little pop-up window that displays the instructions you typed in for the current layer.

▾Calibrated

If checked, the design is calibrated. Show the calibration procedure.

note: *Only visible if the Calibration option is enabled.*

▾ATC

If you have the ATC option enabled, you can temperarely disable it by unchecking this field.

Note: *Only visible if the ATC option is installed.*

Current tool values

Here the current tool values will be displayed during processing

Note: *The values will be shown for the current tool, until a new tool has been selected for processing*

Tool nr

The current tool number that is processed

Diameter

The Diameter of the current tool that is processed

Speed

The speed of the current tool that is processed

Depth

The Depth of the current tool that is processed

Usage

For drilling this shows the number of times the current tool is used.
For Routing this shows the total distance the current tool has traveled.

Iteration

This show the number of iterations used for this tool and how many iterations were already performed.

7.1.2 Manual Operations

Warning, when operating the machine manually, please be aware what you are doing.
Example: if you drill a hole and forget to raise the head before you move the head the tool will certainly break.

The Ribbon tab Manual Operations is used for:

- Manual positioning of the spindle
- Defining offset points
- Capture Mode
- Camera calibration

Click on a Tab, button or field for a description.

Emergency Stop

When the machine is running, hitting this button will interrupt the process by stopping the spindle and disabling the motors.
The position in the data list that was currently processed will be preserved so starting the machine will continue where it was stopped
When the machine is started again, it will go first through the initialization before continue, this is because all the motors were disabled.

 **ESC**

▾Move by arrows

XY Arrows

Use these arrows to move the head in the desired **XY** direction.
You may use also the arrows on the keyboard. (hold them for repeating the movement)
If you use the **numeric keypad** the keys correspond to the 1-9 keys
So diagonal movements are performed by pressing key 1, 7, 9 , 3
You may use in this case the 5 as the XY home key.

Z Arrows

Use these arrows to move the head in the desired **Z** direction. (up / down)
You may use also the Ctrl + up / down arrows on the keyboard. (hold them for repeating the movement)
If you use the **numeric keypad** the keys correspond to the 2,5,8 keys
You may use in this case the Ctrl + 5 as the Z home key.

Step Size

When you are moving the head manually you may set the desired step size by selecting it from this drop-down box
You can choose for Metric or Imperial values.

Shift + Up	Increment Metric step size
Shift + Down	Decrement Metric step size
Alt + Up	Increment Imperial step size
Alt + Down	Decrement Imperial step size

Move by value

XYZ Position

Here the current XYZ position is displayed
You may type a value here or use the up/down button.
If you type an invalid value, it will be corrected automaticly.

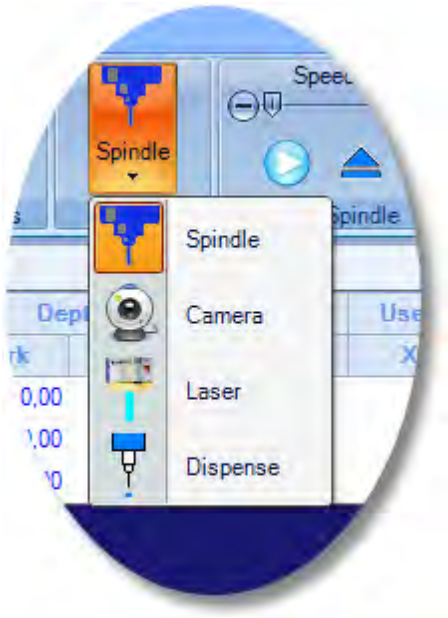
Goto Position

If you have typed a value, use this button to goto the requested position.

Copy Position

The current displayed XY position will be copied to the XY offset

Device



Camera

It shows the Camera tools

Note: *Only visible if a camera is installed.*

Laser

It shows the Laser tools

Note: *Only visible if the laser module is installed.*

Dispense

It shows the dispense tools

Note: *Only visible if the dispense module is installed.*

Spindle

Speed

Select a spindle speed from the drop-down box

Start Spindle

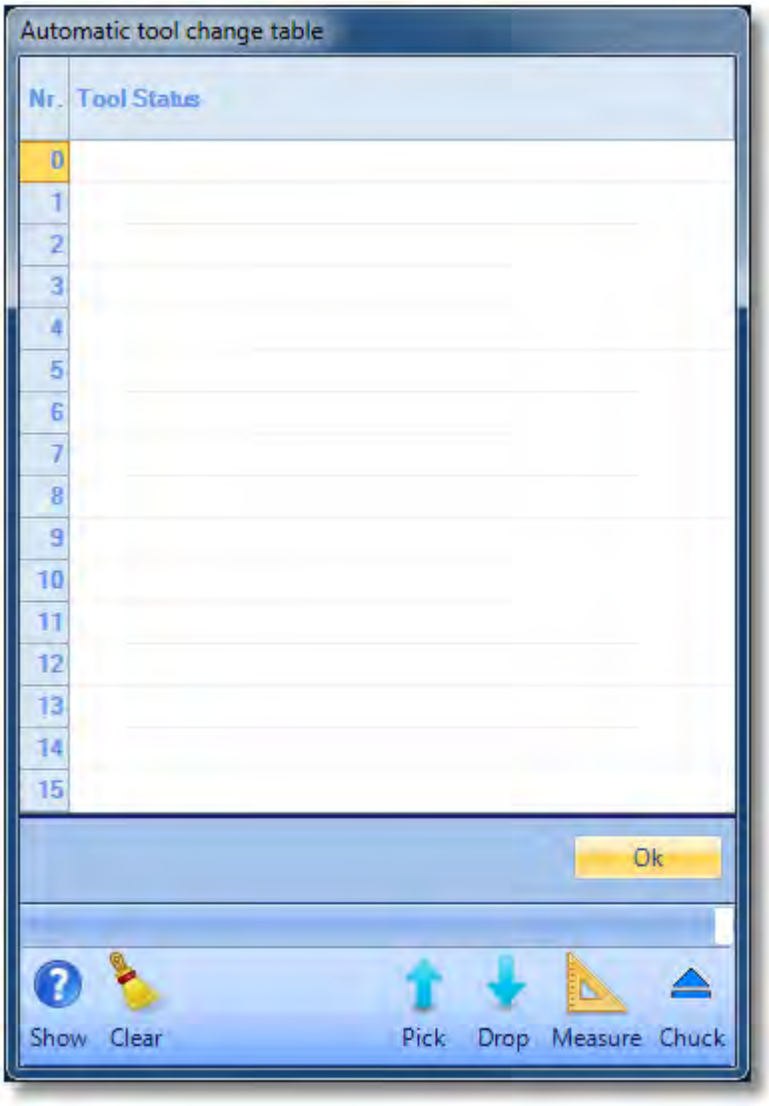
Start the spindle and speed up to the requested speed.

ATC

Please be careful, managing the tools using the ATC table should only be done by skilled engineers!
It is very easy to destroy or damage the machine if you are not careful.

It opens the ATC tool table and gives you the opportunity to handle the tools in the Tool rack.

See the Advanced tutorial in how to handle the ATC.



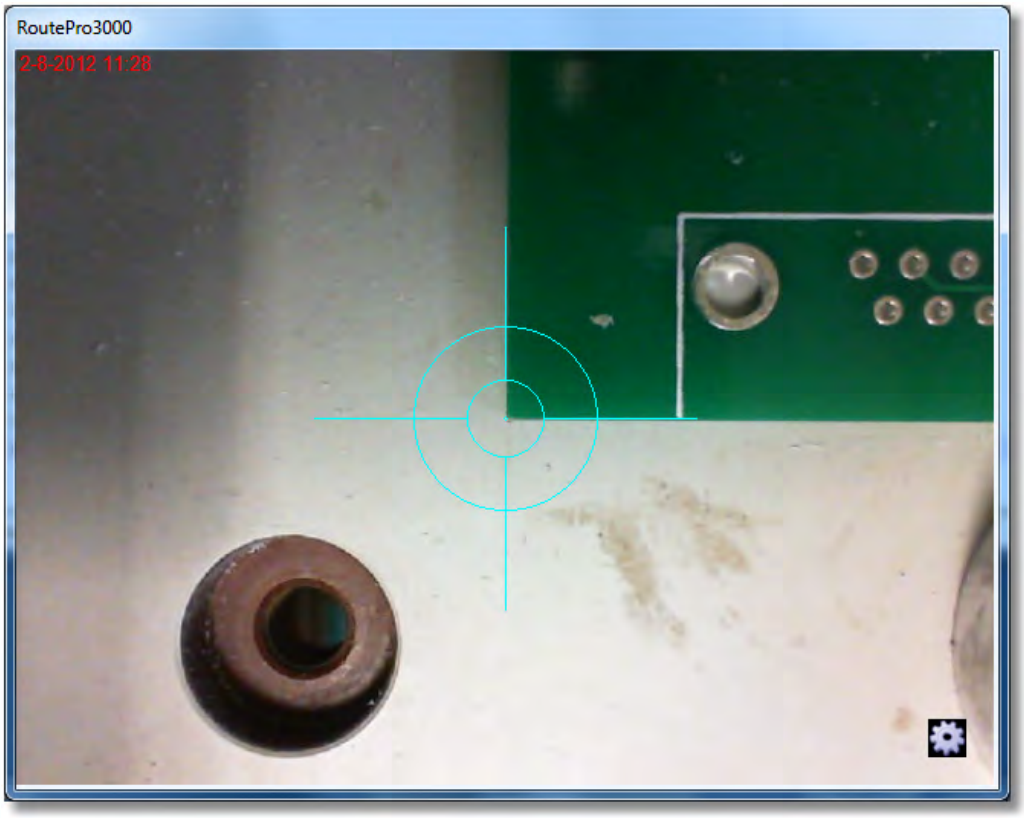
Note: *Only visible if the ATC option is installed.*

Tools

Show Camera

Please be careful, pressing this button activates the machine and the camera will be positioned.

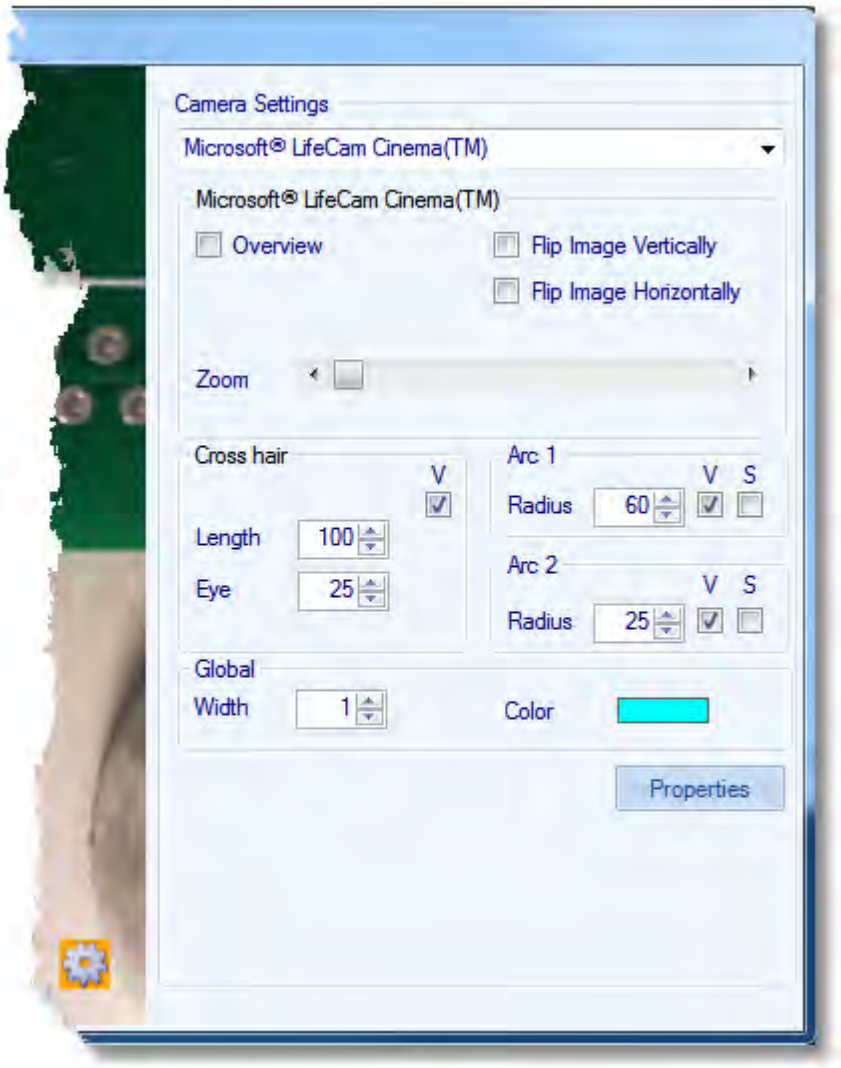
If you have a camera attached, this will show the camera window.
The head will add the offset from the camera to the XY offset.
Then the camera is positioned in place of the head.



Camera Options

This is a toggle button

Display the Camera Options



Click on a button or field for a description.

Camera Settings

Camera Selection

Here you can select the camera that is mounted on the CCD machine

Overview

This option is only available under the Calibration license

Display the camera overview window, this is useful when your main screen is zoomed in.

Flip Image Vertically


This option is only available under the Calibration license

Flip Image Horizontally


This option is only available under the Calibration license

Zoom

This option is only available under the Calibration license


Note: *There is a zoom (belonging to the camera) under the camera properties,* ***do not use that****, it's not precise.*

Cross-hair

Length

Adjust the length of the cross-hair.

Tip: *If you set it to maximum, you can use it for PCB alignment.*

Eye

Adjust the eye of the cross-hair

Visible

Show the cross hair

Arc1


This option is only available under the Calibration license

Radius

Size of the outer Arc

Visible

Show the outer Arc

Synchronize

Synchronize the outer Arc with the end points of the Cross-hair

Arc2


This option is only available under the Calibration license

Radius

Size of the inner Arc

Visible

Show the inner Arc

Synchronize

Synchronize the outer Arc with the inner points of the Cross-hair

Global

Width

This is de line width of the Cross-hair and Arcs

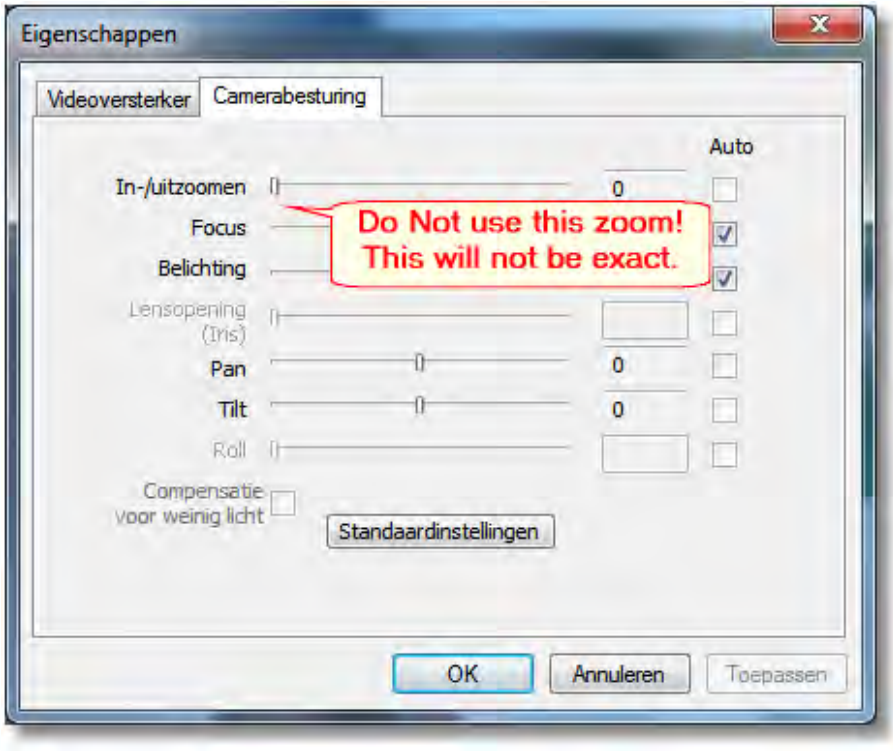
Color

You may choose a different color here for the Cross-hair and Arcs

Properties

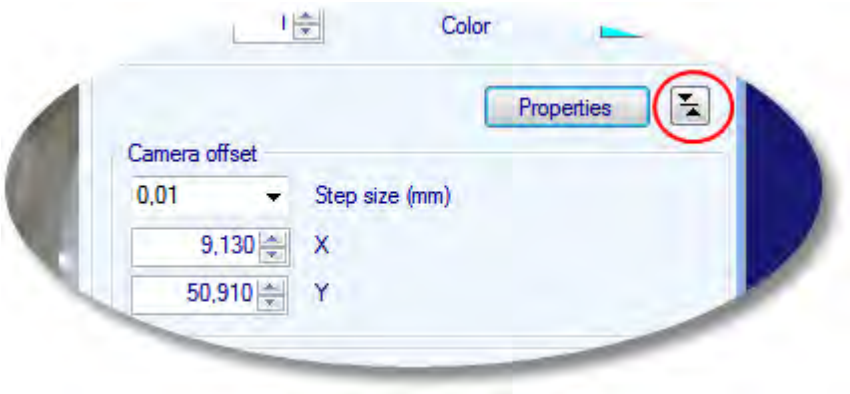
Here you can set some camera properties but normally you do not need these.
If the auto focus is not optimal you can try to set the focus manually.

Note: *Use the zoom feature from RoutePro3000 to zoom in. Do not set it here because it is not precise.*



Calibrate Camera

This will enable a special panel in the camera viewer, for calibrating the camera



Click on a field for a description

XY offset

Use the up / down buttons to move the camera to the desired position, the movement is defined by the step size.
Note: Do not type in the values because they will not reflect immediately.

Step size

Select the step size for camera calibration

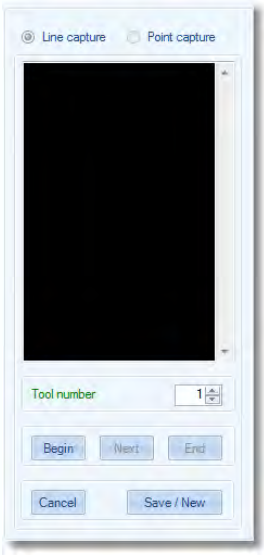
Capture Mode

In this mode you can capture the current position and create a Line or point file.

Line Capture

In this mode you can capture lines. It is not meant to build complicated data but it

is a handy tool to create outlines.
The output will be stored in a HPGL file.



To start:
Position the head to the required start position of the line(s) you want to capture.
Then press Begin, this will mark the current position as a start-point.
The commands are automaticly added to the panel.

Position the head to the next position.
If you have just a single line you may press End.

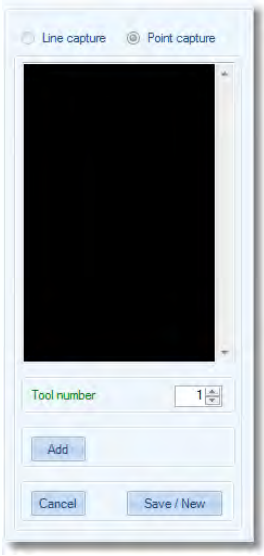
If you want multiple line connected to each other press Next and position again
and add the lines as long as required.
If you need to end the sequence: press End.

You can select a different tool, but only while the pen is UP (not in a sequence)

When done press Save / New to store your file.

Point Capture

In this mode you can capture points (drill data). The output will be stored in a Excellon file.



To start:
Position the head to the required start position of the point you want to capture.
Then press Add, this will mark the current position as a co-ordinate.
The commands are automaticly added to the panel.

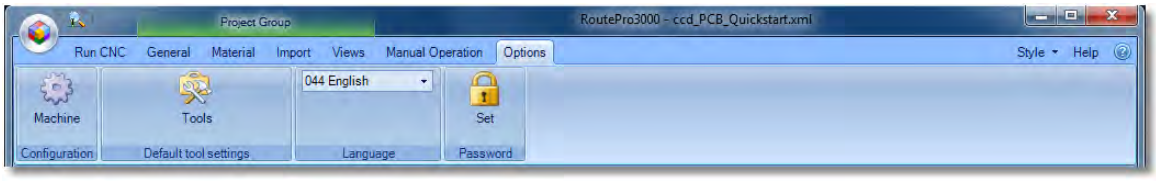
Position the head to the next position.
And press Add again.

You can select a different tool if you prefer.

When done press Save / New to store your file.

7.1.3 Options

The Ribbon tab Options is used to set the global parameters.



Machine Options

Pressing this button will open the machine options window.
Here all the machine specific parameters are set, these are global settings used for all your projects.
Note: *Project also have there own specific parameters, which are stored in the project folder.*

Default Tools

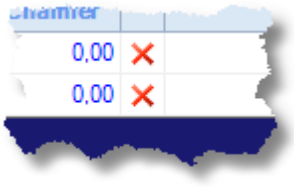
RoutePro3000 comes with a set of default tools which should make setting up projects very easy.
There are currently default tools for Routing, drilling and laser

When you press the Default Tools button a list box appears showing the currently displayed tool list.
Tools are selected by a combination of the type of Tool used, Material and Diameter.
This implements that there could be more tools with the same diameter but for different purposes.

Example: there could be a tool for FR4 with a diameter of 1,00 mm and also a tool with the same size but now for PVC.
So selecting PVC as the material type in the Project Wizard will take the parameters for the tool set for PVC.

You may add your own tools by clicking the plus sign in the lower left corner of the list.

You can delete tools by clicking the X in the list.



By the way, did you notice the little question mark in the top right hand corner?
This is a toggle button, it enable the hints while hovering over the list.
But if you are experienced, hints could be annoying so you can leave them off in that case.

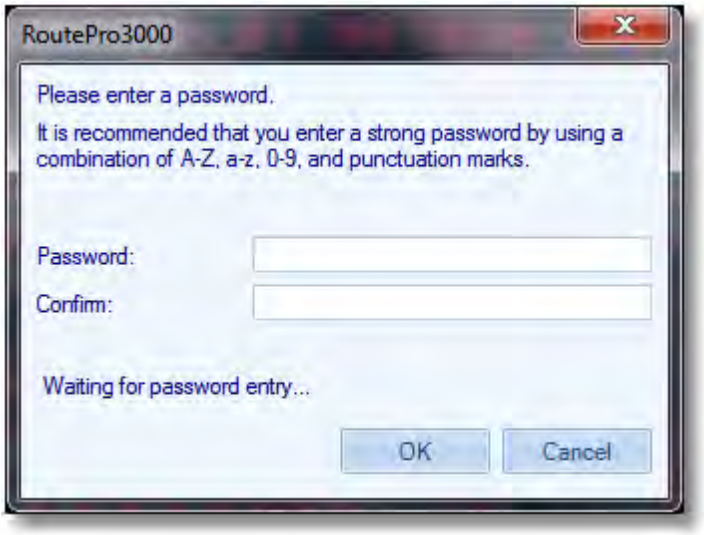
Note: *If a tool is not found by the Project Wizard, you need to type the parameters by yourself then this tool can be added automaticly to the default tool table, so the next time you need this tool it will be selected from the default tool table.*

Language

All the languages currently available for RoutePro3000 will be listed here. You may select the language you prefer.

Password

To prevent unauthorized changing of machine parameters, you may set a password.



Please note:

Store a copy of the password in a save place because if you lose it, you are not able to set the machine options anymore. reinstalling RoutePro3000 will not recover or delete your password !

▾Change or remove the password

The password can only be changed or removed if you know the password.
Press Set Password.

If a password is set, the following screen appears:

First type the old password, fill in the fields if you want to change the password and press OK.
Note: *if you leave the **Password** and **Confirm** fields empty, pressing OK will remove the password.*

Note: *if you used the password to open the option screen it will remain in memory until RoutePro3000 is closed.*

▾Style

Here you may select the style you want to use for RoutePro3000.
First select the style then you may adjust the colors using the Custom scheme option.

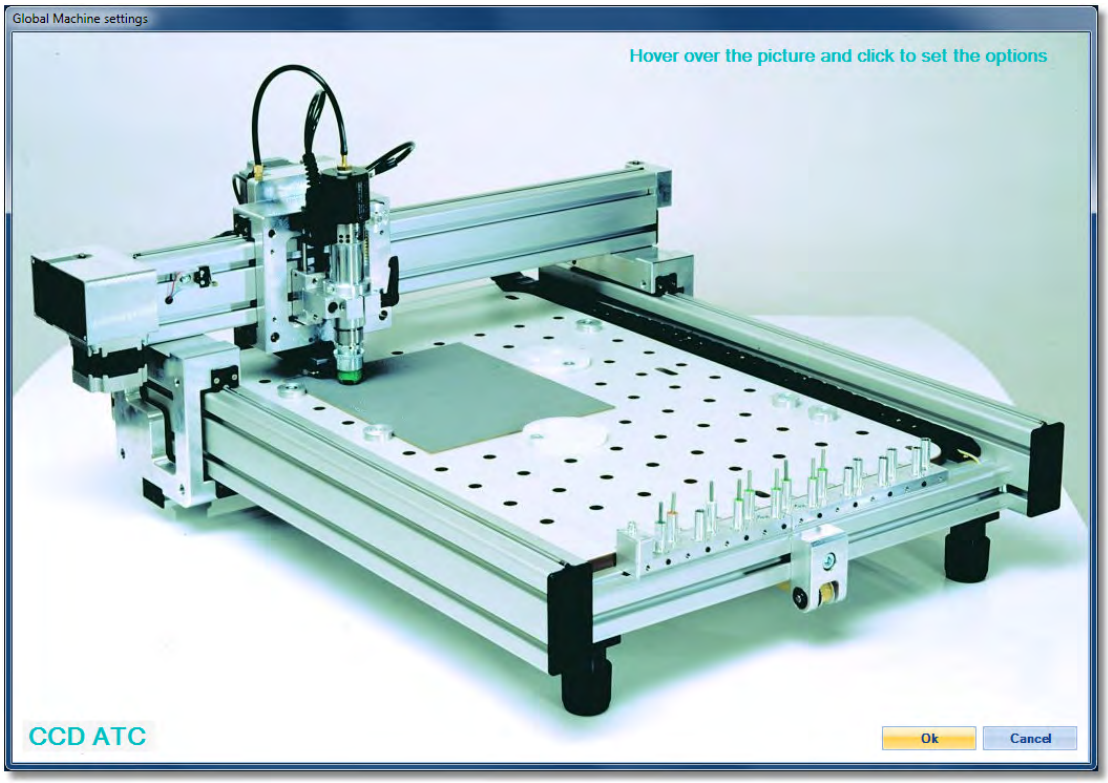
The style is stored along with your project so you can use different styles for different type

of projects if you prefer.

7.1.3.1 Machine Options Overview

Overview

Before going into detail, please read this overview.

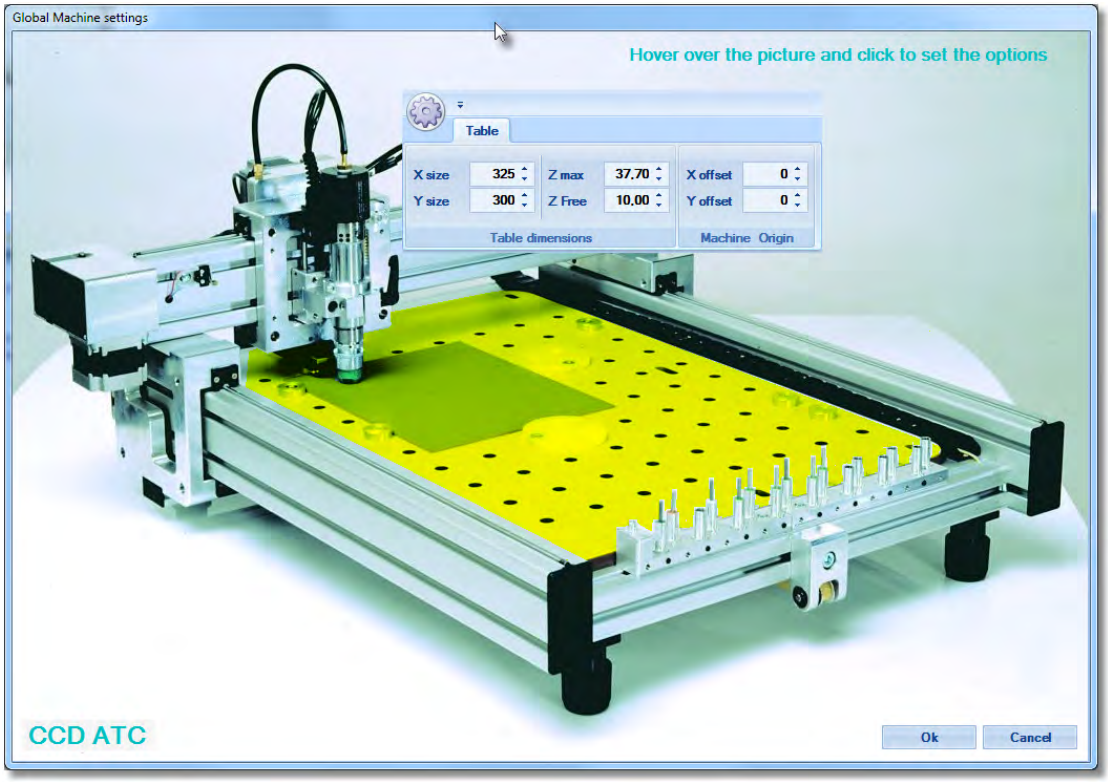


RoutePro3000 has an unique way to handle settings. Big screens and lists with parameters work confusing and are not user very friendly.

So we took a different approach: we only show you the parameters you are interested in. If you have the Global Machine setting screen in front of you, just hover over the picture, you will notice that different parts of the machine will give you a hint.

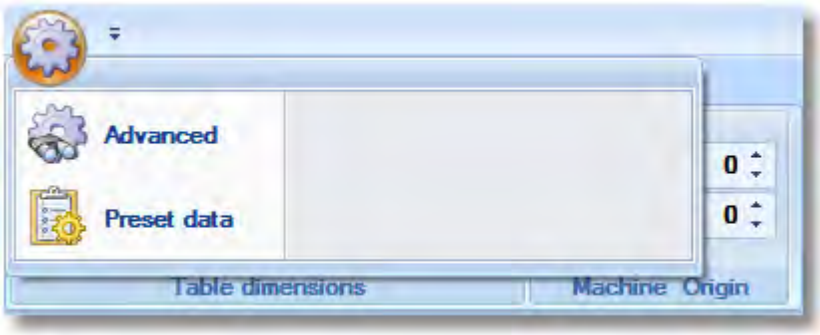
So if you hover over the table it shows:

Now click on the table !



Notice that the table is high lighted and **only** the parameters, you need to set for the table, are displayed.
This system works for all the main components on the machine.

▼Advanced Parameters



However your machine has a few extra parameters like calibration, but it is advised that only a skilled technician should alter these.
There are also parameters in case you have purchased extra modules, you will find them by clicking on the little wheel
in the top left hand corner of the parameter window and then advanced.

This will enable the rest of the parameters
Note: the picture below may differ depending on the installed options.

▼Preset data

Load machine specific parameters.
These parameters are set by the manufacturer while preparing and calibrating your machine.

Normally you do not need them because they are installed during installation.
But in case you have lost your CD and need to install the program again. (loaded from internet)
You may request your dealer of a copy of the settings.

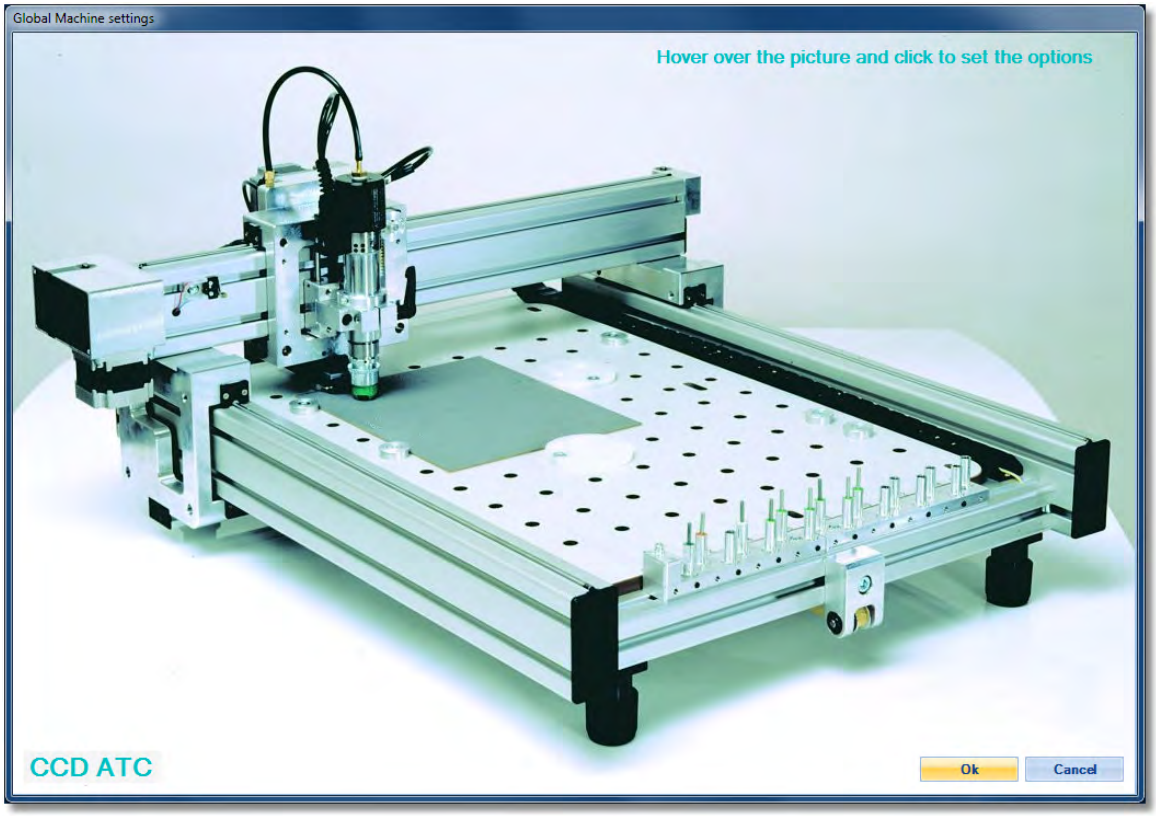
Note: *You will also find the file on the CD in the folder resources.*

To load the file, click the button Preset data and browse to the folder containing RoutePro3000.xml.
Select this file and press open.
Now your machine has been setup with the correct machine settings.

Now explore each option in detail

7.1.3.1.1 Machine Options Details

When you enter the Machine Option screen it opens the following window.



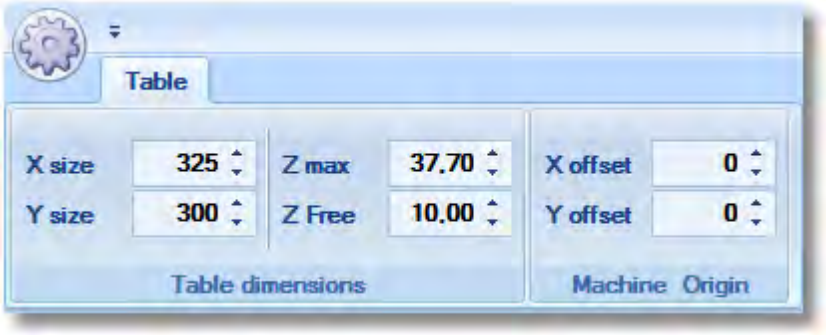
.

▾Selecting a machine type

On the lower left hand corner you may select the type of machine you own, click on the text:

This will open a list from which you may select your machine type.

▾Table Settings



▾Table Dimensions

Table size

The actual workspace (limits) on the machine is defined here.
This values will be used to determine if your design fall within the limits of the machine.

Z Max

This is the maximum height the head can be lifted.

Z Free

When a board is being processed, whenever the head needs to be lifted to travel to the next coordinate, this value indicates the height the head will travel above the board and is used instead of raising the head to the maximum. This will speed up the process.

Note: *set this value so all obstacles, when moving the head, will be avoided. The lower the value the faster the machine runs, this is especially the case when drilling or dispensing.*

Note: *normally you do not need to change these values they are preset by the manufacturer.*

▾Machine Origin

Offset

This is a calibration value to determine where the Machine Origin (0,0) starts. (X + Y end switches are triggered)

Note: *normally you do not need to change these values they are preset by the manufacturer.*

▾XY motor settings

Speed Setting

Max. Speed determines the maximum speed the XY motors can handle.
Reference is used to set the speed used when the machine is performing a reference run (determine the zero positions)

Note: *normally you do not need to change these values they are preset by the manufacturer.*

Start/Stop Speed

When the machine starts moving, it rapidly goes to the speed set by the **Start/Stop** parameter,
from there it accelerates, using the **Ramp Steps**, to the required speed.
These values are also used when decelerating.

Note: if another spindle or device is mounted with more weight, it could influence the working of the machine
in this case you can adjust these parameters to overcome loss of steps.

Z motor Settings

Speed Setting

Max. Speed determines the maximum speed the Z motor can handle.
Reference is used to set the speed used when the machine is performing a reference run (determine the zero positions)

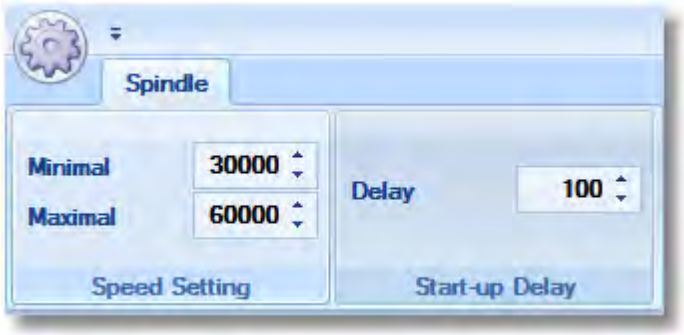
Note: *normally you do not need to change these values they are preset by the manufacturer.*

Start/Stop Speed

When the machine starts moving, it rapidly goes to the speed set by the **Start/Stop** parameter,
from there it accelerates, using the **Ramp Steps**, to the required speed.
These values are also used when decelerating.

Note: if another spindle or device is mounted with more weight, it could influence the working of the machine
in this case you can adjust these parameters to overcome loss of steps.

▾Spindle Settings



▾**Speed Setting**

Here you can set the minimum and maximum speed (rpm) the spindle can run.

Note: *normally you do not need to change these values they are preset by the manufacturer.*
Warning: *Running the spindle with different settings could destroy the spindle!*

Be care full when the machine is placed in a protective cabinet or confined place:
The spindle used on our machines is a KaVo high speed spindle, If your machine is placed in a protective cabinet
or confined place, please make sure that the vacuum cleaner is always running, with enough suction, while the spindle is running.
This to prevent dust, circulating in the cabinet or confined place, get sucked into the spindle.Cluttering up the ball bearings.

▾**Start-up delay**

The spindle initial speed is the minimal speed and for every 2000 rpm speed increase the delay will be used to get the spindle running at the required speed.

▾Tool test Settings

⚠ Use this option only if your machine is equipped with an Automatic Tool Change unit.

Tool tester Position

These are the XY coordinates of the Tool tester.
The Z depth is determined by the switch, i.e. this is the position where the switch is activated. It should be calibrated with a tool that has the correct length.

Note: *The tool tester is always located outside the table boundaries.*
Note: *normally you do not need to change these values they are preset by the manufacturer.*

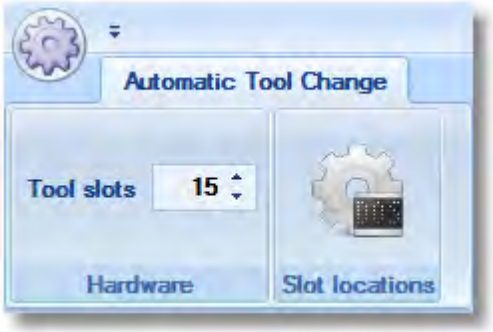
Length correction

If the Tool tester finds a tool that is shorter or longer then the standard length, it can automaticly correct the behavior of this tool by
adding or subtracting the difference to the required work depth. The maximum correction used is set with this parameter.

Example: *if the value is set to 1 mm and the tool is 1 mm shorter or longer, it will be corrected, if it's outside these boundaries it will fail.*

Automatic Tool change (ATC) Settings

Use this option only if your machine is equipped with an Automatic Tool Change unit.



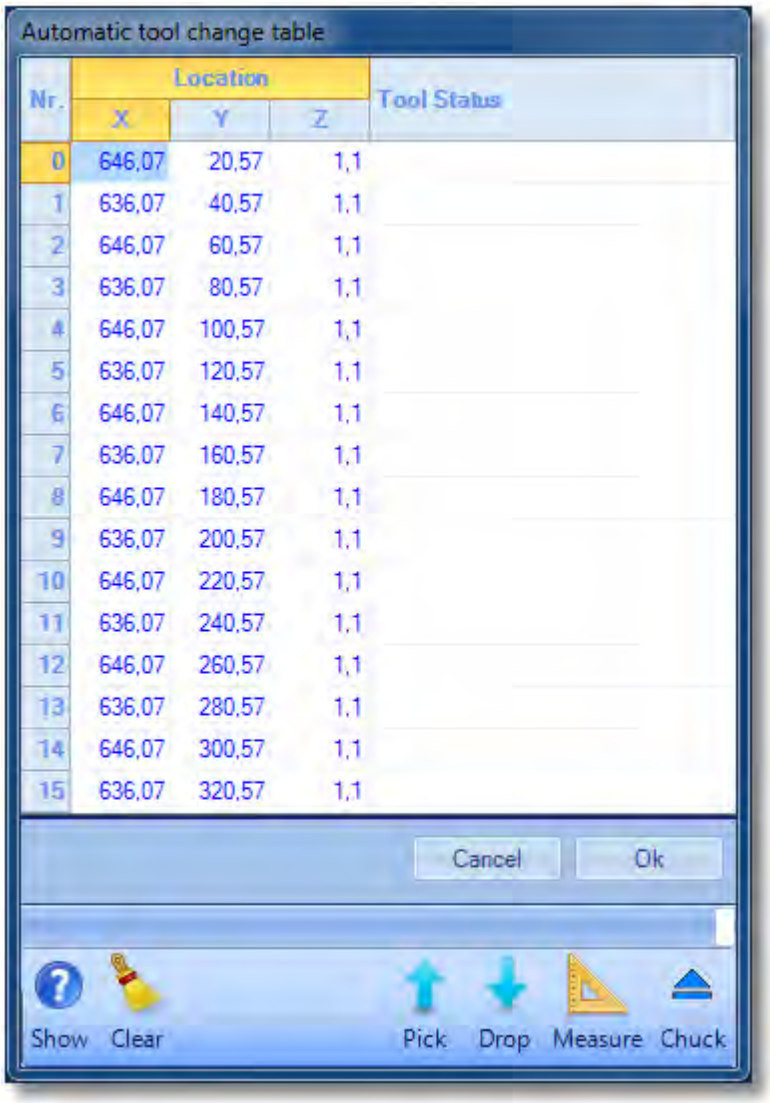
Hardware

Here you set the number of tool slots your machine is equipped with (starting with number 1)

Note: *The tool slots are always located outside the table boundaries.*
Note: *you will notice a tool slot 0 as well, this is used to store the test tool and cannot be used as a standard tool holder.*

Slot Locations

Clicking this button opens the ATC tool table, where the slot location are registered for each tool holder.



Do not use the buttons at the bottom of the screen before reading How to handle the ATC.
Using this buttons could destroy your tools and damage your machine if not handled by a skilled technician.

Note: *normally you do not need to change these values they are preset-ted by the manufacturer.*

7.1.3.1.2 Machine Options Advanced

Calibration

Motor Calibration

The setting are used to calibrate the motors on your machine.

X Calibration is performed by setting the X motor value first to 1, the run the machine over a length of 20 cm
measure the difference and use the calculated factor as calibration factor.

Y Calibration is performed by setting the Y motor value first to 1, the run the machine over a length of 20 cm
measure the difference and use the calculated factor as calibration factor.

Z Calibration is performed by setting the Z motor value first to 1, the run the machine over a length of 2,5 cm
measure the difference and use the calculated factor as calibration factor.

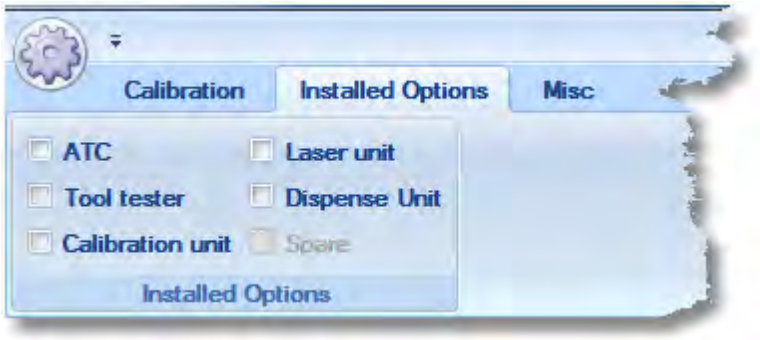
Note: *normally you do not need to change these values they are preset by the manufacturer.*

Motor Step Size

The only value you may change here is the Step rate.

You may select 1/2, 1/4 or 1/8 step.
The smaller the step, the smoother the machine runs, however it also makes the machine slower.

Installed Options

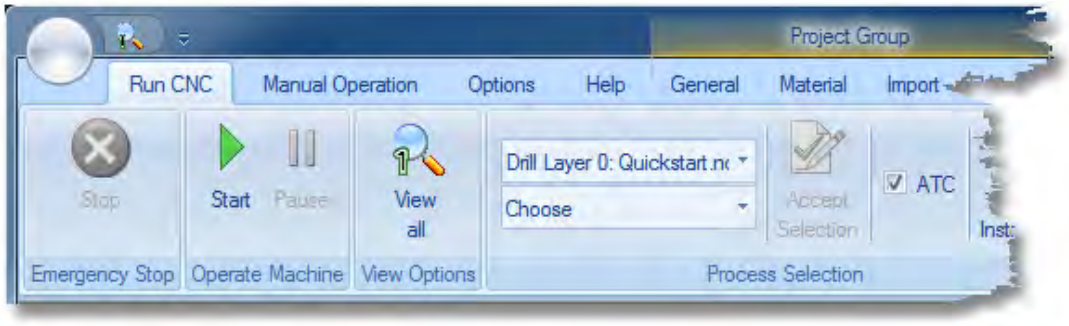


ATC

Use this option only if your machine is equipped with an Automatic Tool Change unit.

This box should be checked if you have an Automatic Tool Change installed on your machine and you want to use it.

It is possible to skip the ATC for the current project, if ATC is enabled, there will be a check-box visible under Run CNC



Uncheck this box to disable ATC.

Tool tester

This box is automaticly checked if you have the ATC box checked and indicates that an ATC is available.

Calibration unit

Check this box if you have a Calibration module.

Note: *you need a camera to use the calibration unit.*

This option is only available if you have obtained a license, however if you check it without a license
it will give you the option to test this module for a period of 14 days.

Laser unit

Check this box if you have a Laser Module

Note: *you need a laser unit to use this module.*

This option is only available if you have obtained a license, however if you check it without a license
it will give you the option to test this module for a period of 14 days.

Dispense unit

Check this box if you have a Dispense module

Note: *you need a Dispense unit to use this module.*

This option is only available if you have obtained a license, however if you check it without a license
it will give you the option to test this module for a period of 14 days.

Spare

This is for future use.

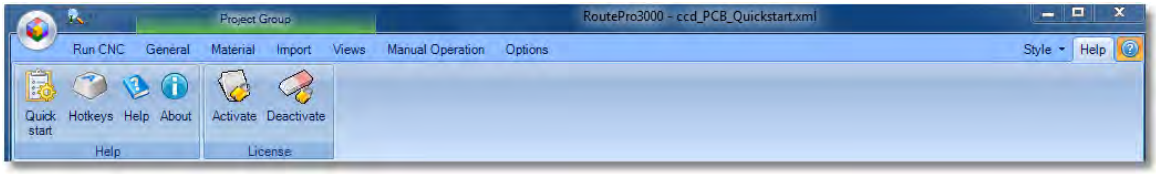
Miscellaneous

Log Level

In case you experience some problems running the machine, you can set the log level to 4, this will create a log file which you can send to your support center for examination.

7.1.4 Help

The Ribbon tab Run Help provides the help and the license manager.



Show Help

Shows the Help file. And if context sensitive help is available it jump to the correct topic.

F1

Quick Start

This will open the Quick start Tutorials pages in the help file for you

Ctrl + F1

Show Hotkeys

This will show the HotKey table in the help file

Alt + F1

About RoutePro3000

Shows information about RoutePro3000 and the installed modules.

Activate License

Use this button to activate licenses.

Deactivate License

Use this button to deactivate licenses

7.1.5 Project Group

When you start RoutePro3000 the Project Group shows only the General tab.

When a project is created or loaded it will show all the tabs and expand to more buttons and fields.

7.1.5.1 General

The Ribbon tab General is a part of the Project Group and contains the basic project data.

Click on a button or field for a description

Project Wizard

Create a new or update the current project.

Open

Opens an existing project.

Global Offset

This will offset all the layers with the same distance, if you need to offset only one or more layers, use the offset in the layer table

Scale

Here you may set the scale for the design, this scale is set to all layers.

Note: *if you want to set the scale per layer, you may do so in the Layer itself.*

Base

This is the thickness of the base-plate used as underlayment on your table.

Calibrate PCB

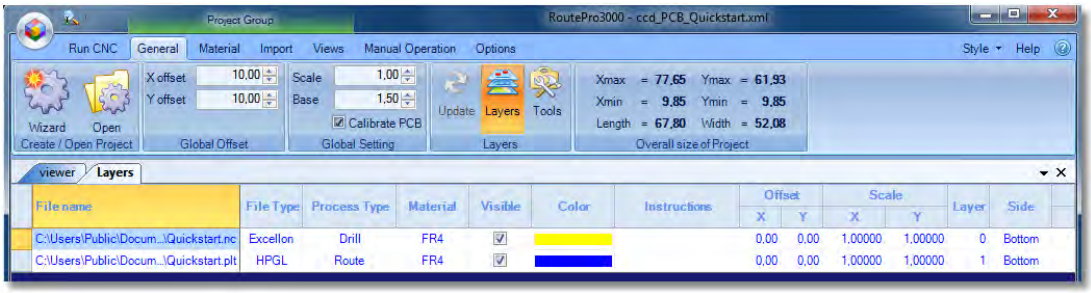
If this option is only visible, you have a calibration module.
Setting it will enable the Calibration mode.
How to use the Calibration....

Update

This button will be enabled each time parameters are changed that influences the design, so it needs to be recalculated.

Layers

This is a toggle button.
It will display the layer info



You may change here:

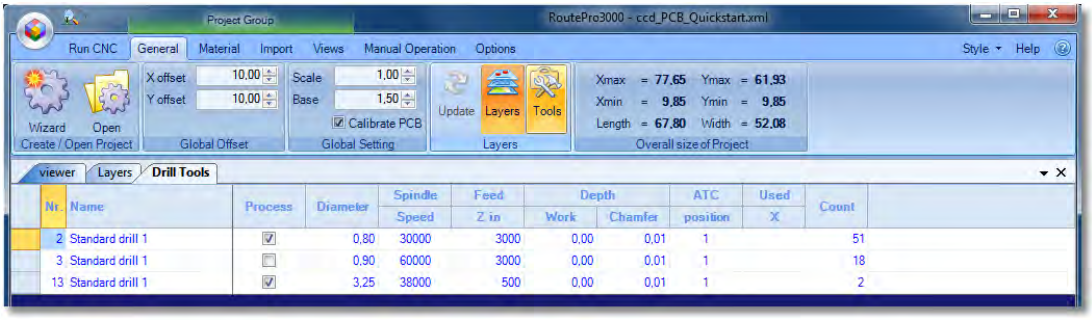
- Visibility
- Color **Note**:*a drill layer color cannot be changed, it will always be yellow, because it needs to indicate a hole.*
- Instructions
- XY Offset (you can use this if there is an offset difference between the layers)
- Side

If you place the mouse in the first field (just before the file-name), you may drag the selected layer up or down in the list
The order of the layers determines the processing order.

Note: *you can switch between the displayed screens by clicking the tab at the bottom of the screen, you may also dock it in another place.*
Note: *if you press the right mouse button you can add this button to the Ribbon Qat*
Detailed description....

Tools

This is a toggle button. (only visible when the Layers are visible)
It will display the tool info for the currently selected layer.



Note: *depending on the tool type the fields may vary*

You may change here:

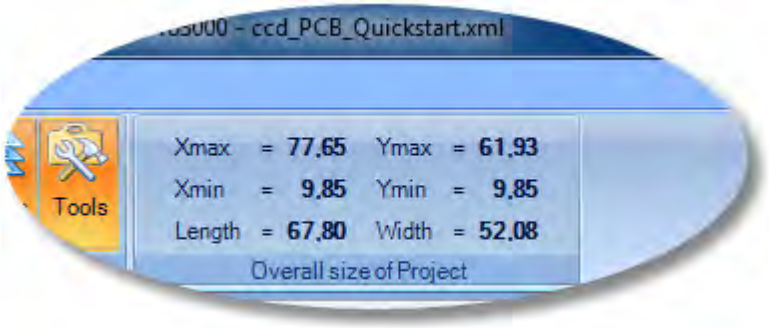
- Tool type (Name)
- Process, but normally this is done by selecting data in the Run CNC tab)
- Diameter
- Spindle Speed
- Feed
- Depths
- Iteration (for routing)
- ATC position
- Used

If you place the mouse in the first field (just before the tool Nr.), you may drag the selected tool up or down in the list
Which will change the processing order for the tools.

Note: *you can switch between the displayed screens by clicking the tab at the bottom of the screen, you may also dock it in another place.*
Detailed description....

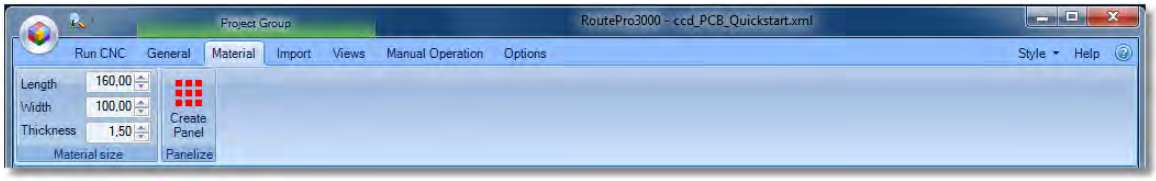
Dimensions

This is a toggle button.
It displays the dimensions of your design.



7.1.5.2 Material

The Ribbon tab Material is a part of the Project Group and contains the material data.



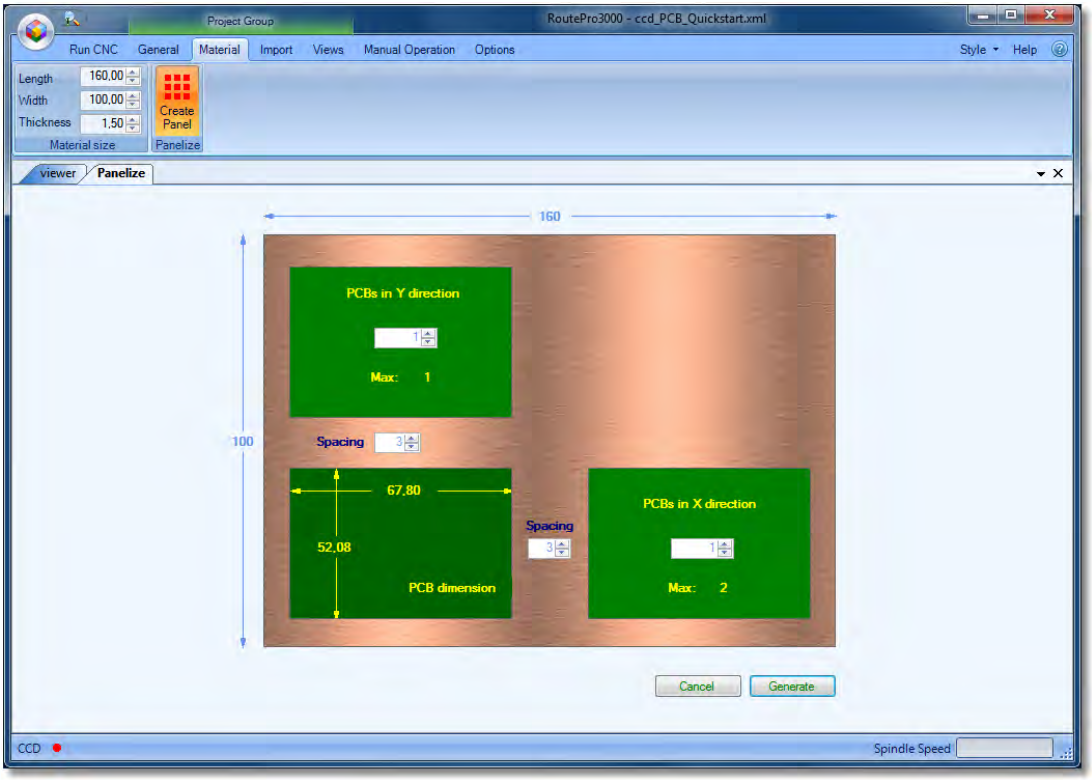
Click on a button or field for a description

Material size

Here you can set the size of the material you placed on the table.
This value is used to calculate the number of PCB's you can place using Panelize.

Panelize

With this tool you can place multiple PCB's on your material.

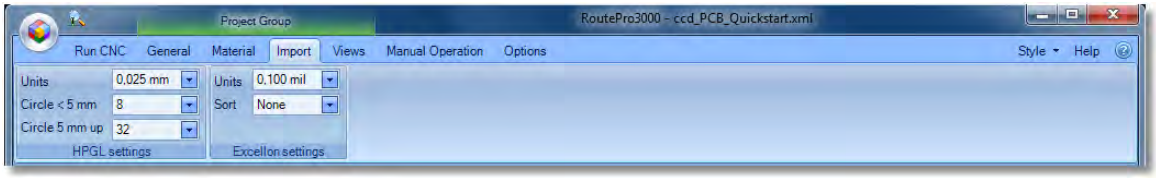


Depending on the material size the number of PCB in X and Y direction is calculated.
Fill in the number of PCB's for the X and Y direction, give the desired spacing and press Generate.

Please note: *if you change a parameter that influences the position or size from your design the number of PCB's will be default to 1. In that case just generate it again.*

7.1.5.3 Import

The Ribbon tab Import is a part of the Project Group and contains import parameters.



Click on a button or field for a description

HPGL Settings

Circle < 5 mm

The value set here determines the number of vectors that will be used to build an Arc or Circle
if such a command is found by the HPGL interpreter and if the diameter is < 5 mm

Circle 5 mm up

The value set here determines the number of vectors that will be used to build an Arc or Circle
if such a command is found by the HPGL interpreter and if the diameter is 5 mm or greater.

Step

This value determines the step-size that is used in the HPGL file. The standard value for HPGL is 0.025 mm.

Excellon Settings

Step

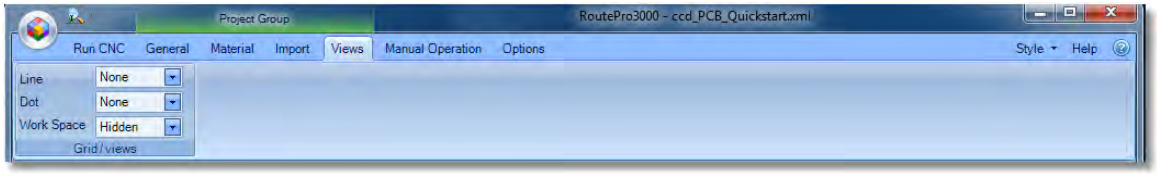
This value determines the step-size that is used in the Excellon file.
If you have created a project and the data files do not match you can change the step size. Read more....

Sort

If you set Sort to Path the points will be sorted in a way that the head needs to make as little movements as possible.
The sorting routine calculates the shortest way to the next point of the same tool.
If you leave it to None, the points will be processed in the order they were read from the file.

7.1.5.4 Views

The Ribbon tab Views is a part of the Project Group and contains the view settings.



Click on a button or field for a description

Grid

RoutePro3000 has two grid types:

Line grid

The line grid consists of horizontal and vertical lines with dimension showed
so it is easy to determine the size of your design.
It can be set to Metric or Imperial
This grid is only displayed from the lower left point of the table to the top right corner of the design.

Note: *You can use the button showed in the red circle, to set the grid anywhere in the program.*

Dot grid

The dot grid can be set to Metric or Imperial

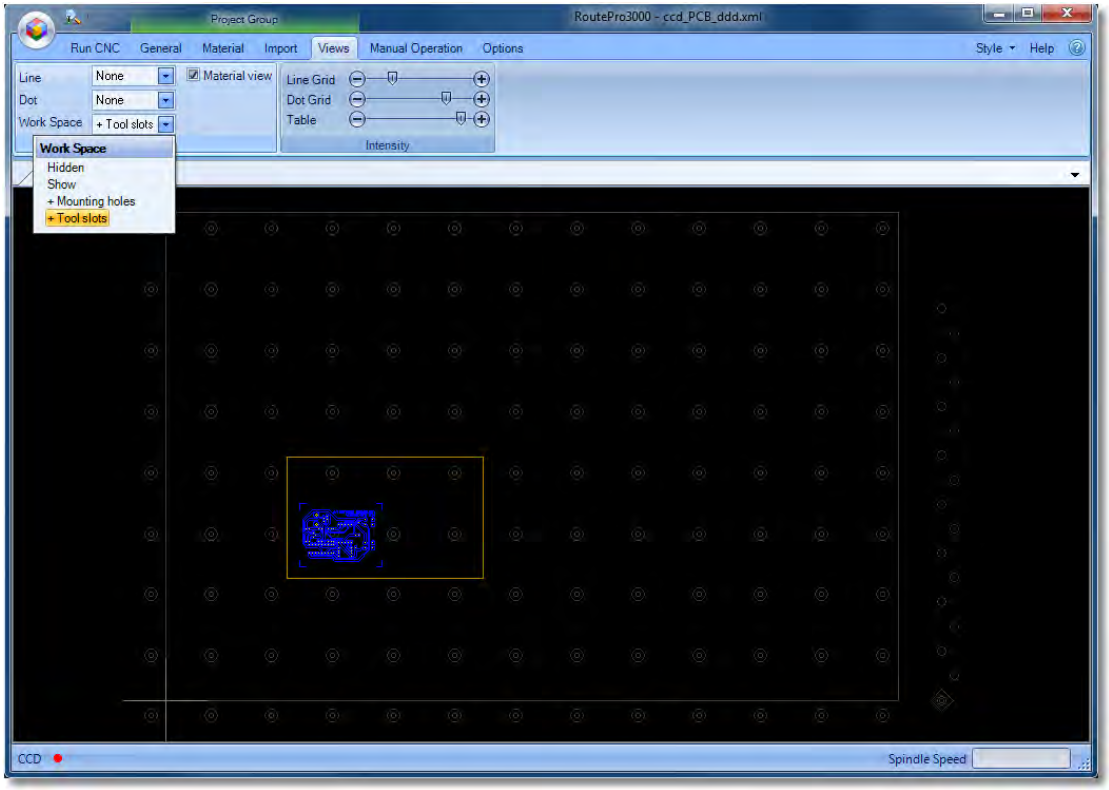
Note: *You can use the button showed in the red circle, to set the grid anywhere in the program.*

Views (Work area)

This will show the outline from the table.

If the RoutePro3000 Extra module is installed you will have the following extra view options

- Show material
- Set the intensity of the line grid
- Set the intensity of the dot grid
- Set the intensity of the table view
- Show the mounting holes
- Show the ATC tool-slots and depth sensor



7.2 Modules

The following modules are available or under development:

▾LaserPro3000

This module is used to produce laser images.
Please note that this module requires a Laser Unit.
read more...

▾DispPro3000

This module is used for dot and line dispensing
Please note that this module requires a Dispense Unit.
read more...

▾Calibrate3000

This module is used to calibrate the position of your material, it has also extended camera features.
Please note that this module requires a Camera.
read more...

▾Documentation

This module is used to create documentation about your machine and your projects
read more...

▾RoutePro3000Extra

This module is used to extend RoutePro3000 with extra features.
read more...

▾Inspection

This module is used to inspect your work
read more...

▾Q-Code

This module is used to create Q-codes for your projects.
read more...

▾Remote3000

This module is used to operate RoutePro3000 from another application.
read more...

▾Script

This module is used to automate RoutePro3000
read more...

All available modules can be evaluated for free over a period of 14 days without any obligation.

7.2.1 Laser Module

Introduction

The laser exposure unit is an add-on-item for the CCD.
Please read the instructions, shipped with the Laser, on how to install the laser on the CCD.

Safety rules

- The laser exposure unit may only be used in connection with a CCD.
- The laser can only be switched on, when it is correctly installed into the spindle holder of the CCD.
- The laser itself has a power 120 mW and is classified as laser class 3B.
- The laser is set into the CCD in a way, which makes it impossible to look directly into the laser light.

Note: *the laser exposure unit may only be operated in a closed rack or hood.*

Please observe the general rules for handling electronic parts, especially ESD-protection.
Before touching the laser head, perform a potential compensation.
E.g put you both hands on an ESD-suitable support before removing the laser from the package.
You need to do the same, before you reassemble the laser from the machine.
By bad conditions like, PVC flooring and shoes with plastic soles, high static charges can occur.
These could damage the laser head.

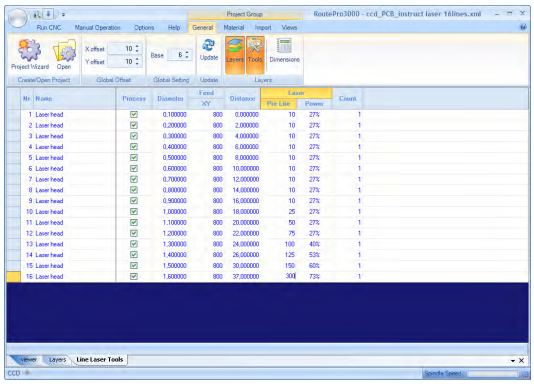
First steps

we assume that you have set up the CCD correctly, installed RoutePro3000 and the laser head is connected to your CCD.

1. Activate the license for the laser. The license file is sent via E-Mail or it is on the RoutePro3000 CD.
2. Before you start exposure, remove the cap from the laser lens.
3. Each laser has slightly different values and needs to be calibrated for the CCD it is attached to.
4. For each laser you must first determine the focus point and the thickest line width (we will call it maximum line). Then the values for the other line widths can be calculated by simple interpolation.
5. Enter the correct thickness of your PCB. Otherwise you will get different line widths. Similar to our 30° and 60° V-cut-routers deviations in board thickness or bends in the PCB will show in the line width. Due to the small opening angle of about 10° the effect is rather small.
6. Laser exposure is more sensitive to over swings when the machine is changing direction. That is why the step resolution is generally set to eighth-step-operation. This results in slower speeds and ramps. With the values shown in the screen shot, you can work well. The calibration factors for X-and Y-axis you must not change, as well as the values for table size and the maximum Z stroke (Z).

Menu Tools:

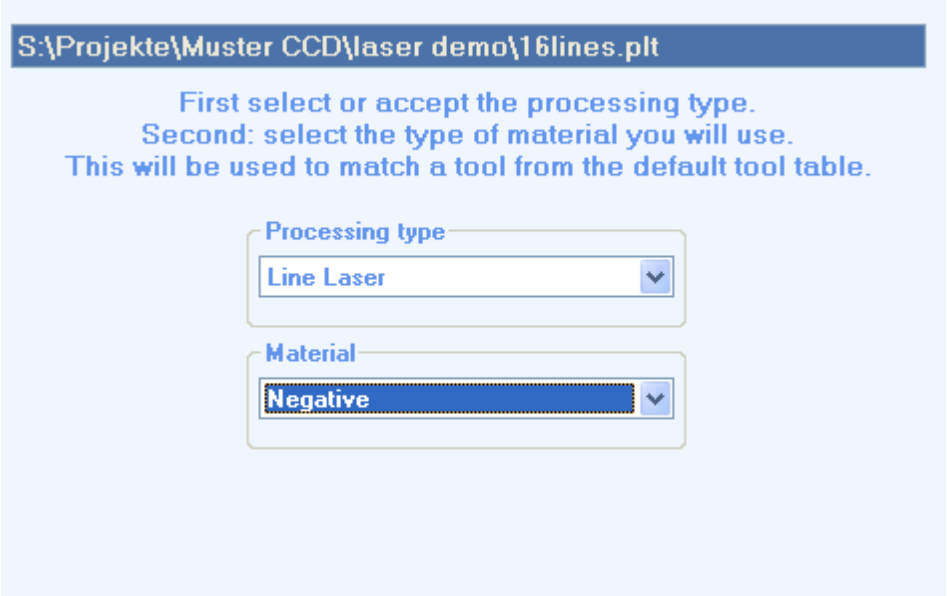
Here we come to the heart of exposure. Now you must enter for each line width the the corresponding height and adjust the speed for X/Y (X feed) and the laser intensity (laser power), so that the laser is both quick and precise and draws the designated line. We will explain further down how to determine the correct values.
The columns in detail:



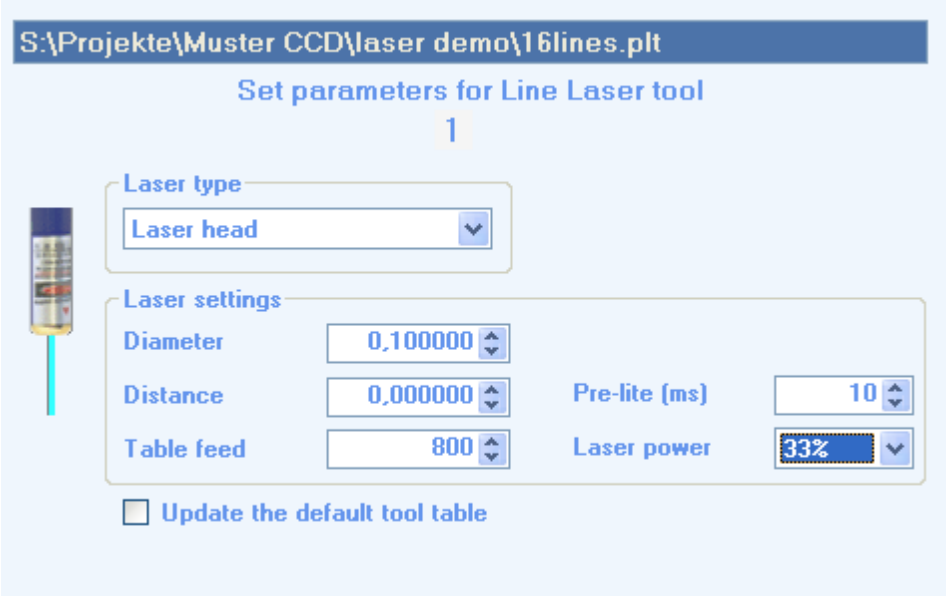
Name:	The tool numbers are imported from the loaded file.
Process:	Check-box to select or deselect certain tools
Diam:	Insert the desired line widths
Feed XY:	Speed for X- and Y-axis. The slower you drive, the higher the exposure time.
Distance:	Insert the corresponding height
Prelite:	When you want to draw wide lines, it is recommended to drive with some time delay, so the start point gets the same amount of light as the rest of the line. Here you can set this drive delay or pre-light.
Laser Power:	In this column you can adjust the laser intensity between 0 and 100%.
Count:	Number of vectors in loaded file.

Calibration

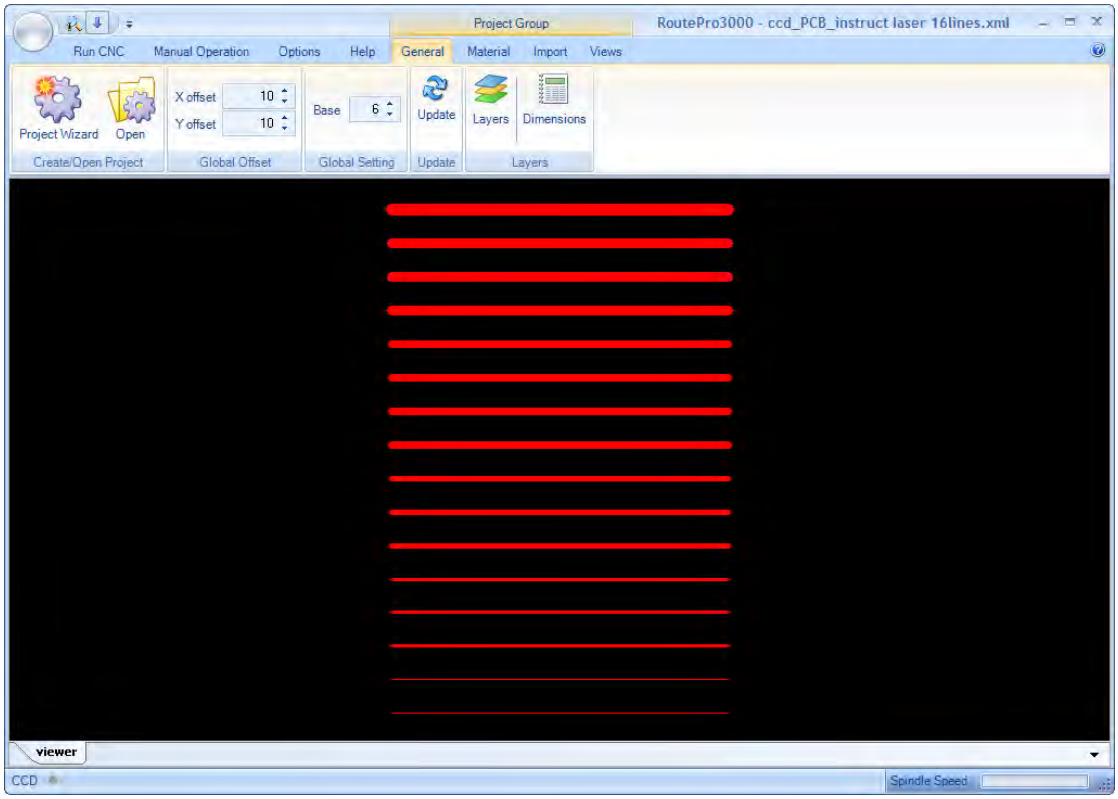
Each laser has slightly different values and needs to be calibrated for each machine.
The laser beam exits from the lens with approx. 2 mm width, focuses at approx. 10 mm distance,
and then expands with an opening angle of approx. 10° to a line width of approx. 5 mm in Z-Max (depending on the machine at about 37.7 mm height).



Step 1 Focus point

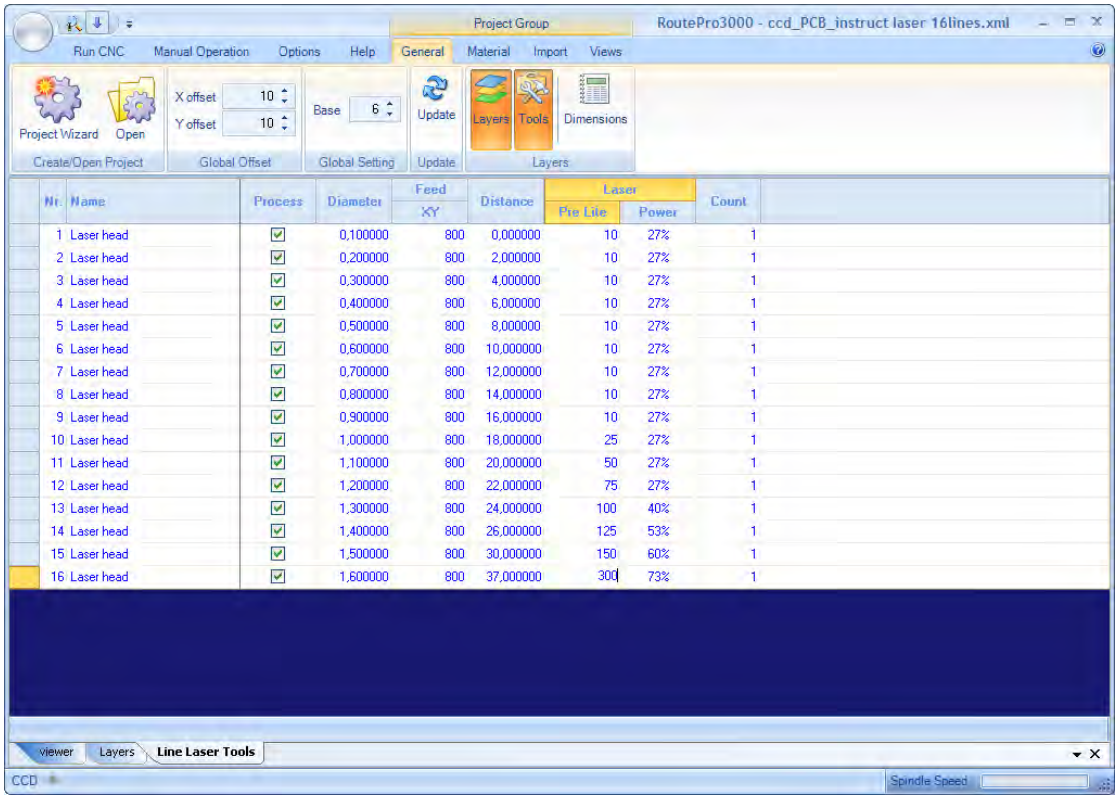


Step 1 in the laser calibration is to find the focus point. Enter thickness of your PCB in the main menu and load the file “16lines.plt". Skip the wizard as much as possible. We will edit the tools directly in the tool table.



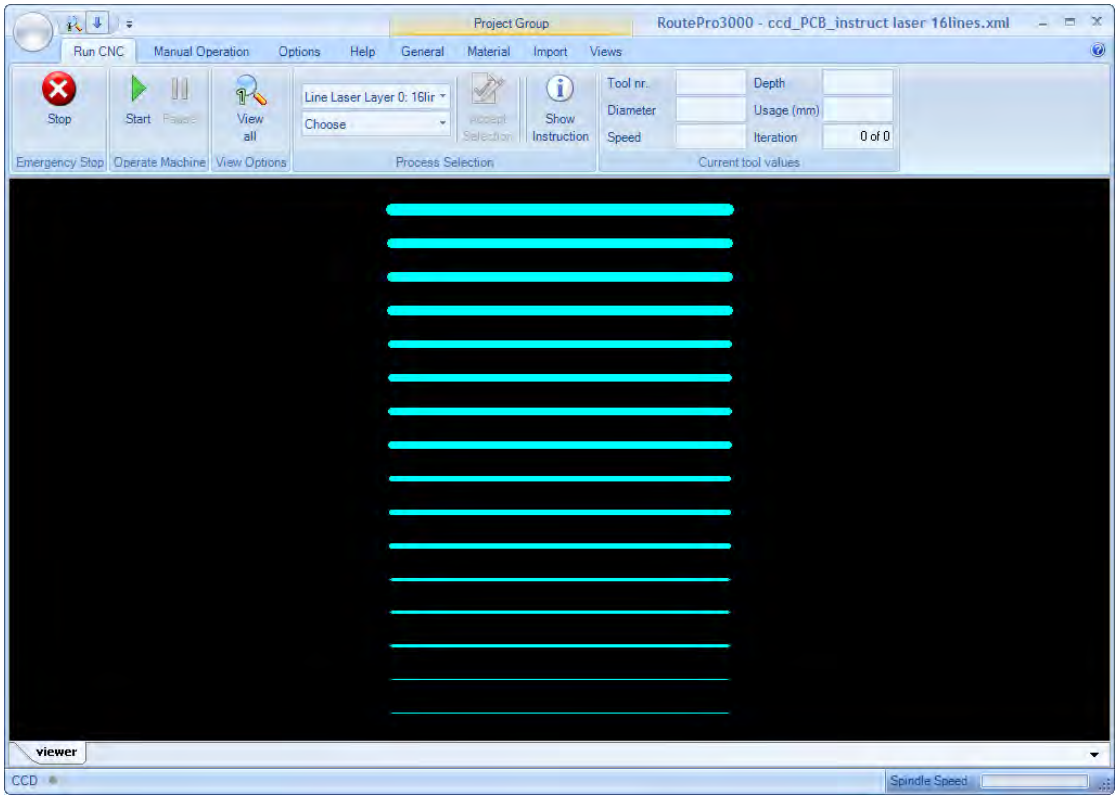
The example here shows a calibration for a negative resist. For positive resist and ALUCOREX the procedure for determining the height is equal, only speeds and laser intensity must be adjusted, since positive resist as well as ALUCOREX require more light for the subsequent development.

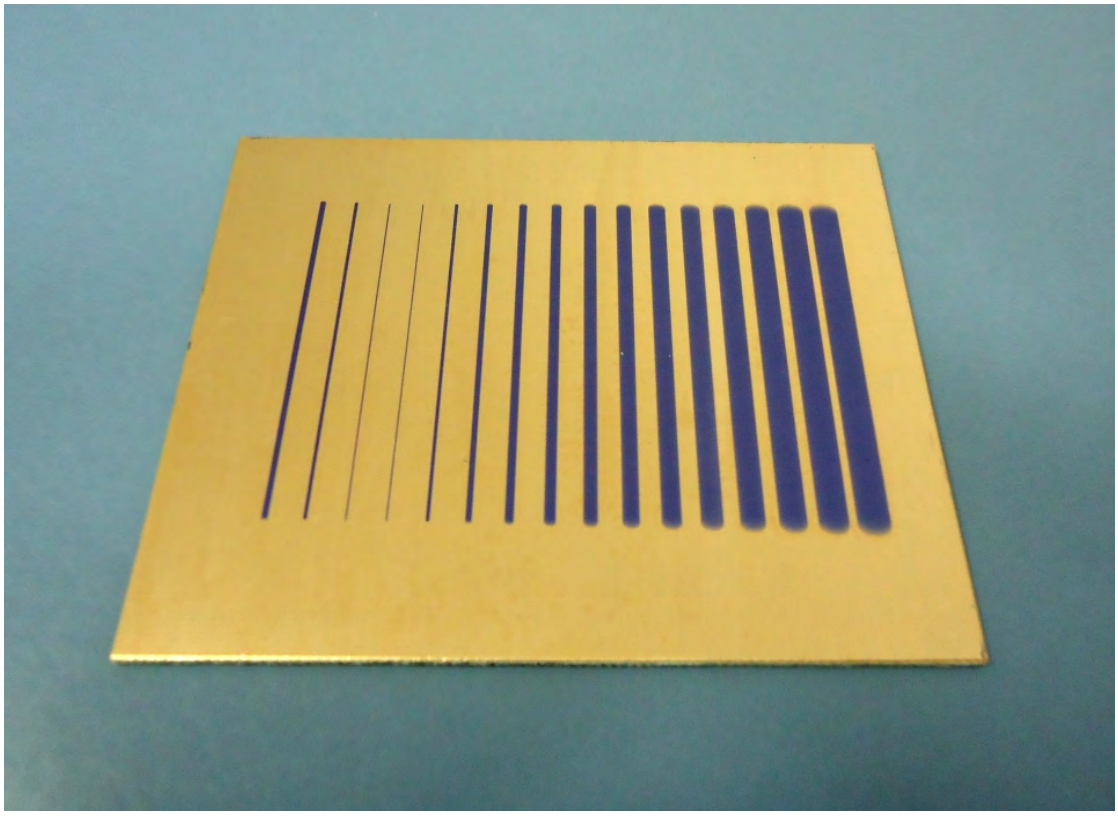
For the first tests you need small circuit boards with negative resist (about 80 × 100 × 1.5 mm) and a spray developing machine. As we examine only the correct image of the lines on the resist, you do not need neither copper clad on the PCB nor an etching machine at this time.
After loading the file 16 lines your viewer should look like this:



Click on layers, select a layer and click on tools. Here at the tool table you can edit the parameters for each tool. For a first test you can insert the values you see in the picture on the right into your software.

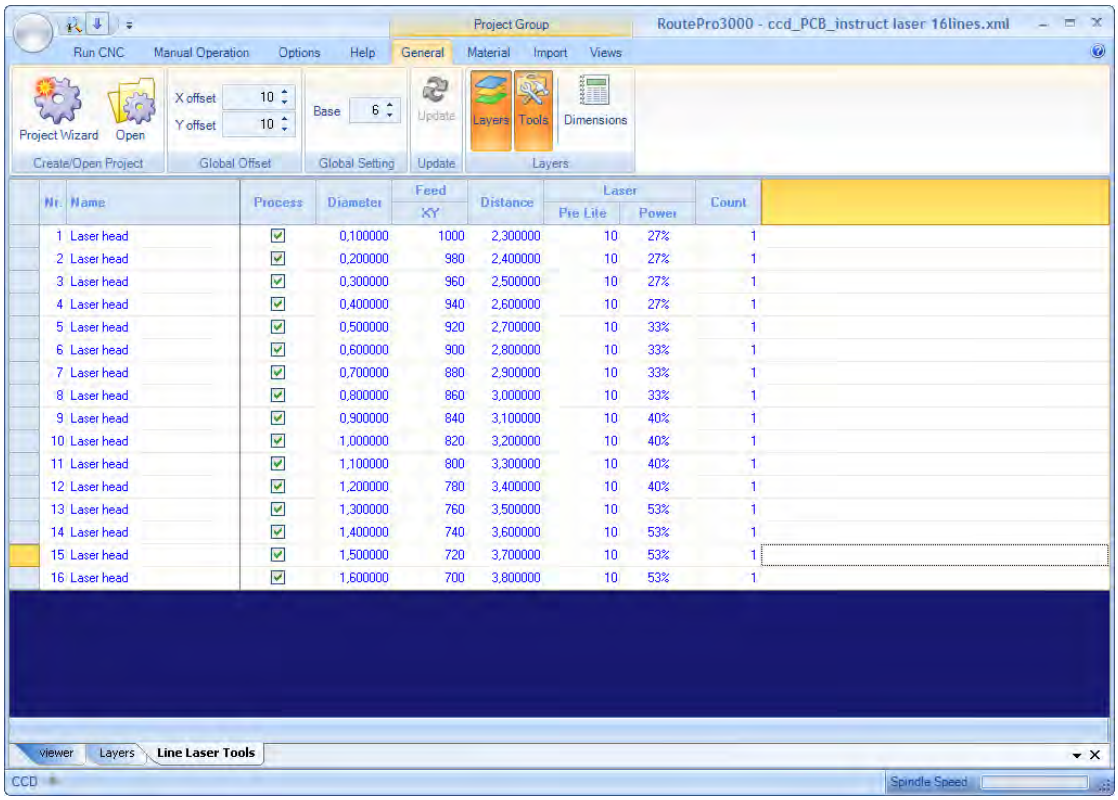
Click on tab “Run CNC” and start the laser exposure.


Project Group
RoutePro3000 - ccd_PCB_instruct laser 16lines.xml
Run CNC
Manual Operation
Options
Help
General
Material
Import
Views
Stop
Start
View all
Line Laser Layer 0: 16lir
Choose
Show Instruction
Tool nr.
Diameter
Speed
Depth
Usage (mm)
Iteration
0 of 0
Emergency Stop
Operate Machine
View Options
Process Selection
Current tool values
viewer
CCD
Spindle Speed

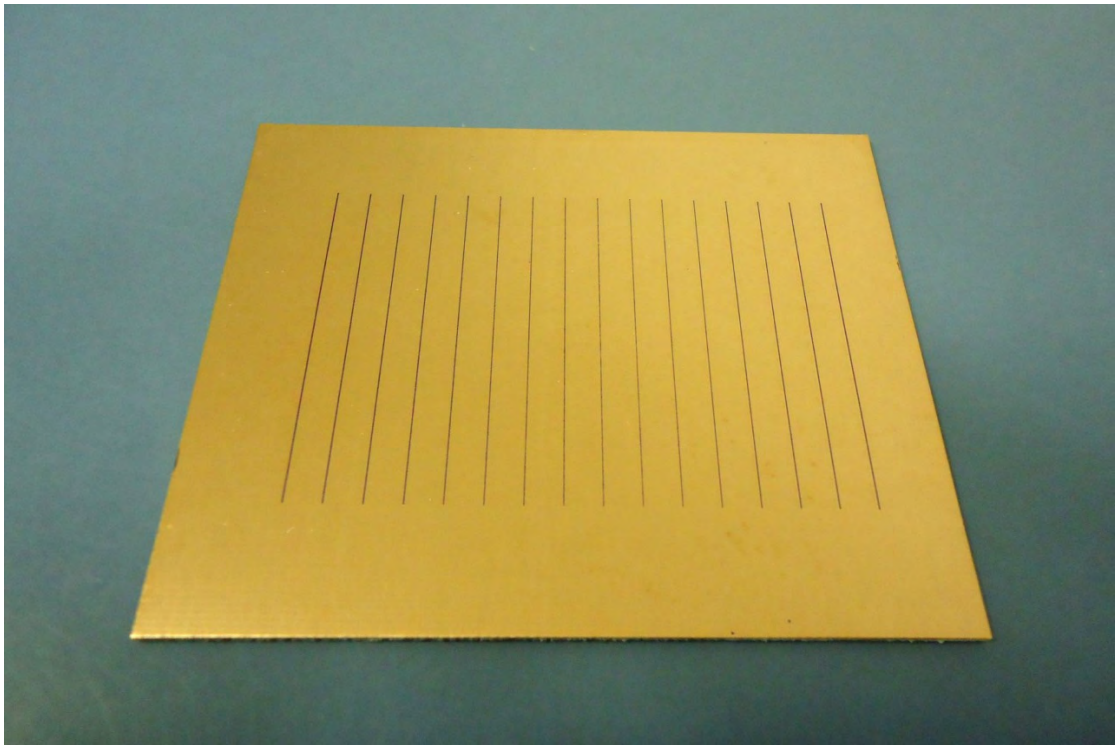


After developing your PCB could look like this:

The thinnest line is approx. at 3 mm height. In this area there has to be the focus point. With one ore two more tries we can narrow down the correct height for the focus point.

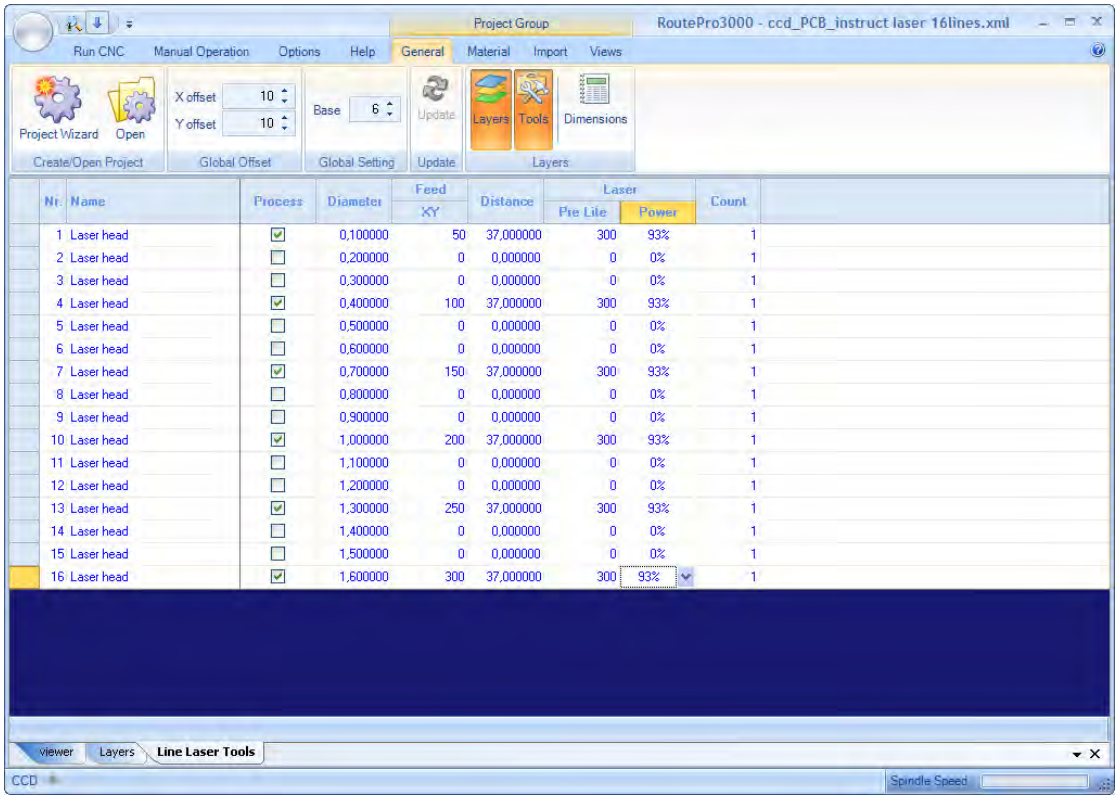


Here you can see an example for narrowing down. In this test already different values for speed and laser power are tested.



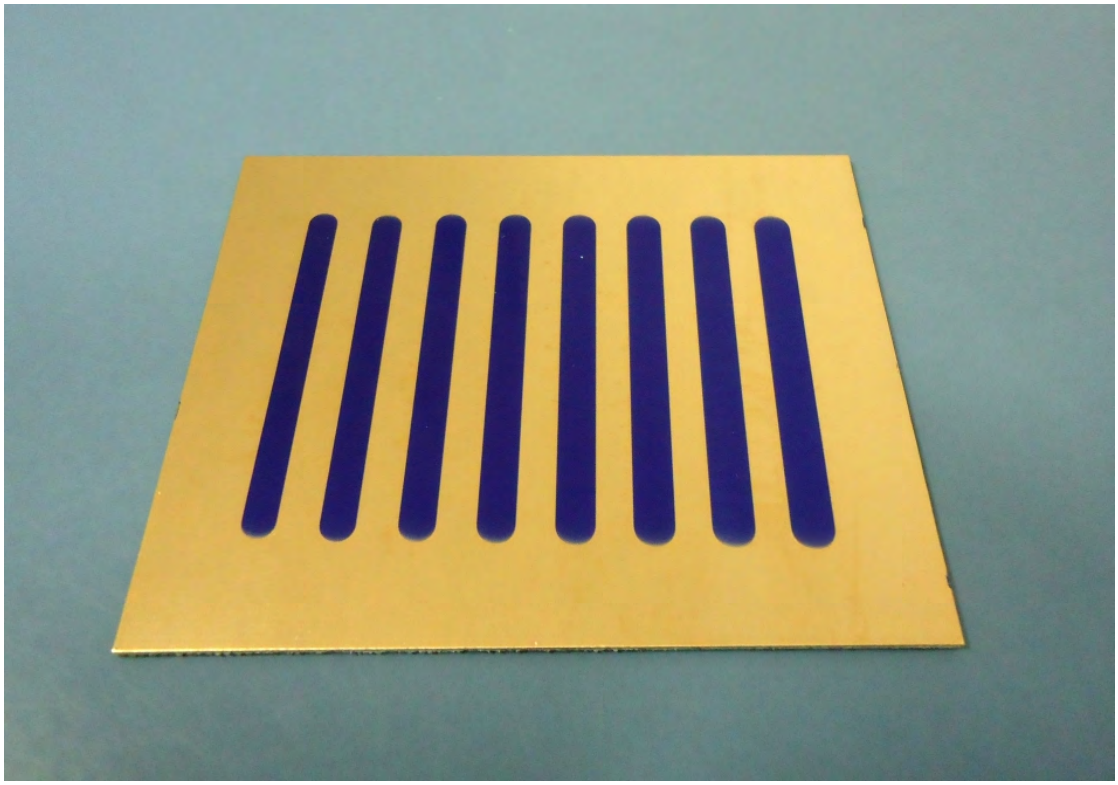
Result after developing:

In this case the focus point is set to 3.7 mm height at a speed of 720mm/min and a laser power of 33.



Step 2 maximum line

In the next attempt we will try to expose the broadest possible line as counter part to the focus point. We will call that line maximum line and you need it to interpolate the other line widths. In the example below, the height is fixed at 37 mm and a few lines are plotted with different settings. Of course wide lines require more light, which means a higher laser intensity and/or a lower speed.

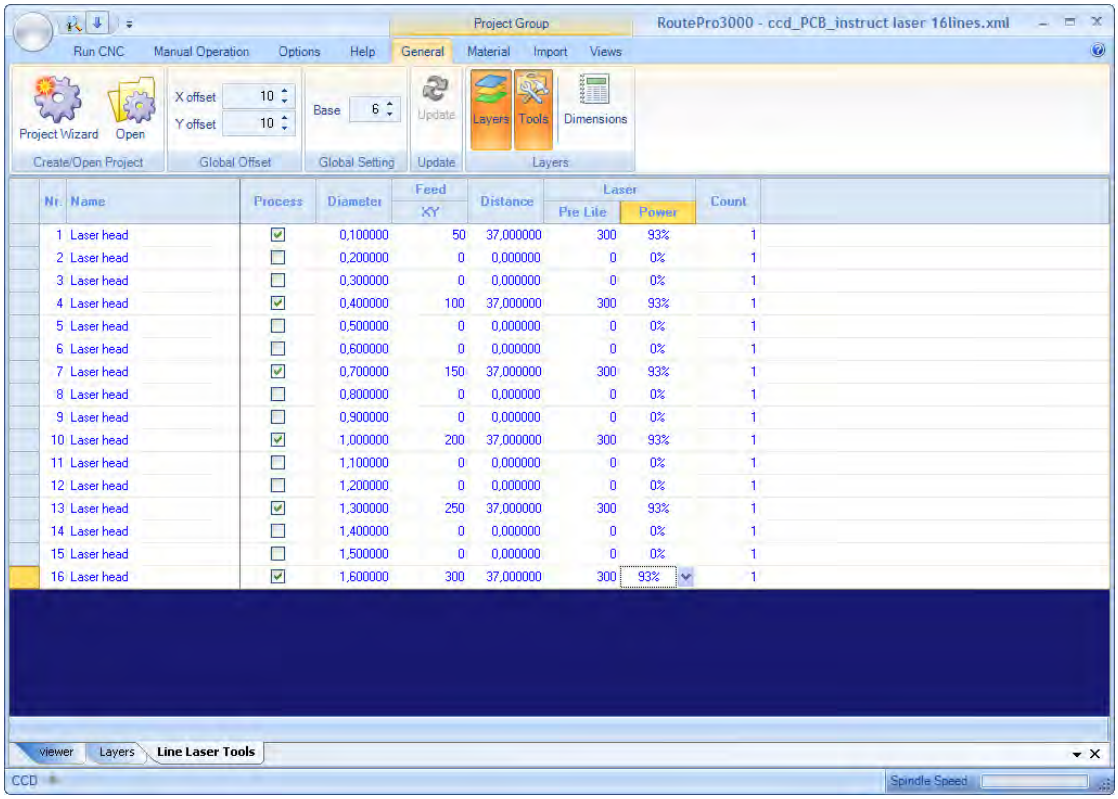


The result could look like that:

In this example we measured with a microscope a line width of 6 mm.
As maximum line width we set 6 mm at 37 mm height. A suitable speed is 50mm/min and a laser power of 15.

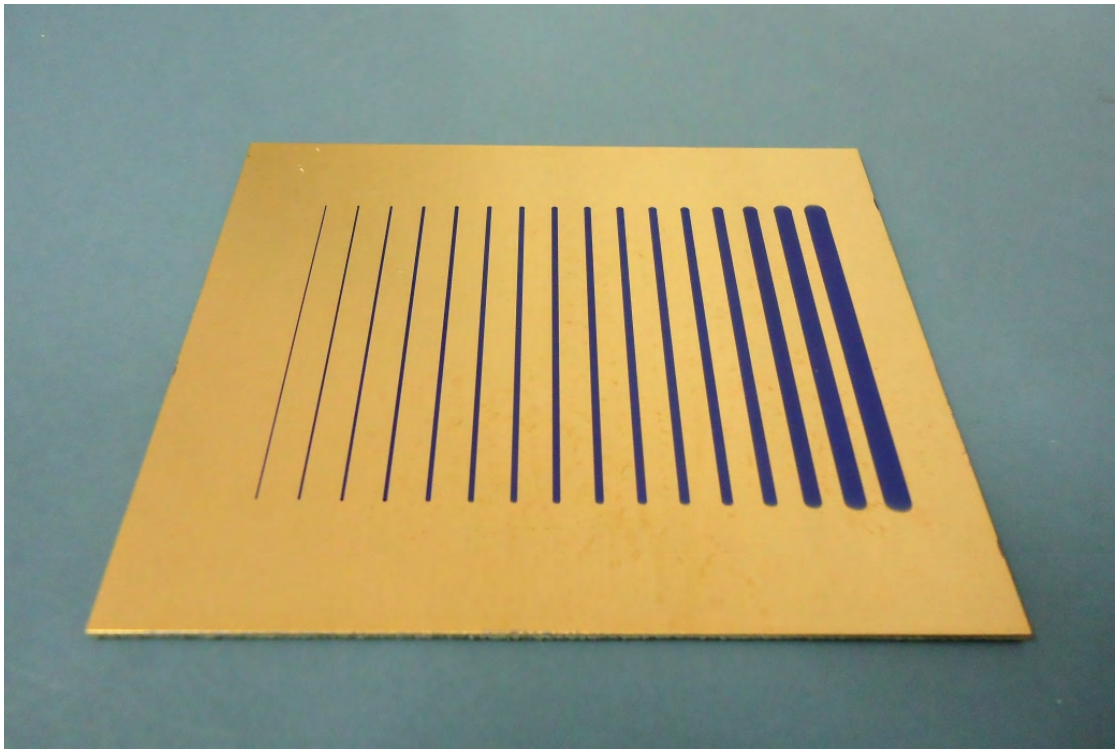
Step 3: Interpolation of focus point and maximum line for the other line widths

An excerpt from the interpolation table you can see below.
How to do:
we divide difference of width between focus point (0mm) and maximum line (6 mm) in parts of 0.1 mm. In this example 60 parts. In the same manner we divide difference of width between focus point
(3.7 mm) and maximum line (37 mm) in 60 segments. This way we get the change of height for 0.1 mm change of width. In this example 0.555mm.

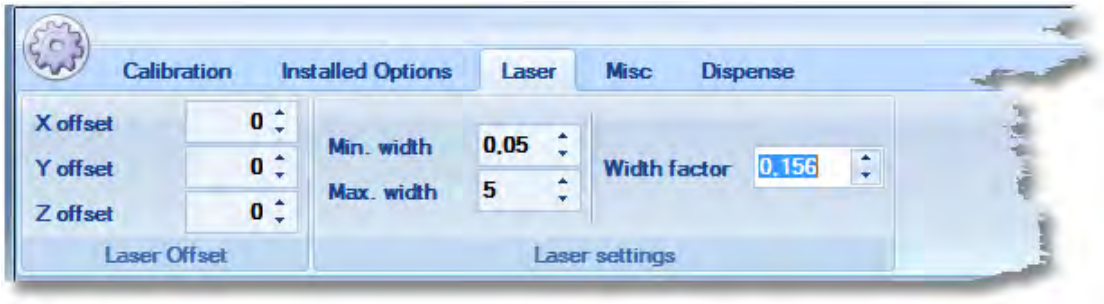


For all line widths we can now calculate the corresponding height.

We transfer the results into the tool table:



and expose a sample PCB with the found values (do not forget to interpolate values for speed and laser power as well !!). Result:



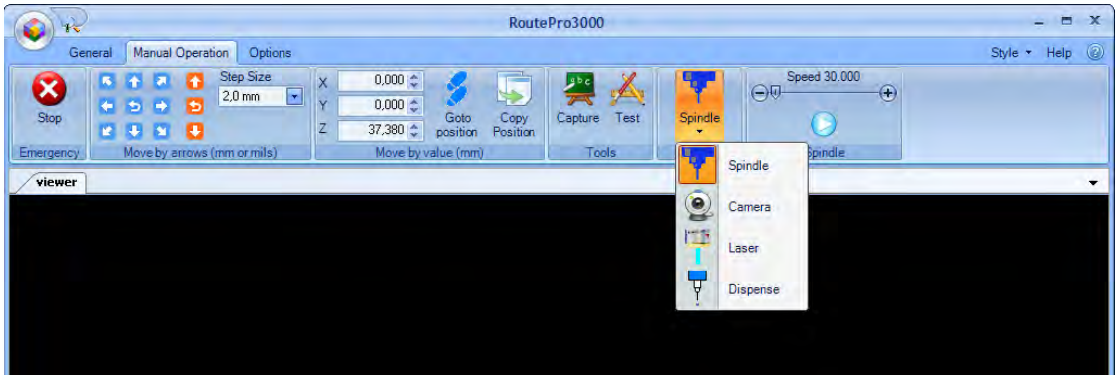
Now comes a very important step. If you want to adjust a correct laser height for all tools you read in with any files, we have prepared a special setting. If you go on register “options” and on “machine” and “advanced” you find the following laser menu:
In this menu you can insert the height of the focus point in the field Z offset. If you happen to notice, that there is a deviation from the drilling/routing spindle to the laser, you can also adjust this offset with the fields X offset and Y offset. We will explain further down how this is done.
To get the correct laser height for every desired line, we need a certain factor to calculate the correct height for the laser. In the example above we calculated that we need to increase the height of the laser by 0.555mm, if we increase the line width by 0.1 mm. Or 5.55mm if we change line width by 1 mm. 5.55 mm is our height factor.
If we inverse the calculation we can say: if we increase the height by 1 mm, we increase the line width by 1/5.55mm = 0.18018.
0.18018 is our width factor and this factor we insert in the field width factor. With this factor RoutePro3000 will calculate the correct laser height for any possible line width between 0.05 and

5 mm.

Determine Offset between spindle and laser head

It can happen that spindle tip and laser beam do not focus on the same spot. If so, it is very easy to determine and correct that offset.
To do so you need the calibration module for RoutePro3000 and a camera. First step is to determine the offset between camera and spindle. Go to manual operation, drill a hole and focus the camera over the hole. This procedure is described in the RoutePro3000 help file at “calibrating camera”.
Write down the values for the camera-spindle offset.
Close RoutePro3000, switch off the controller and mount the laser to the machine. Fix a negative coated PCB to the machine.
Turn on controller, start software and go to manual operation. Switch the device from spindle to laser. Turn on the laser and make a spot on PCB. Switch device to camera and center the camera over the exposed spot. Write down the values for the camera-laser offset.

The difference between camera-spindle offset and camera-laser offset is the laser-spindle offset. This value you can insert at machine – advanced – laser – X offset/Y offset.



Guarantee

All machines are submitted before distribution to examination on function and continuous operation firmness. On the machine we grant a work warranty of 12 months to our customers starting from purchase date on accuracy in material and processing. We warrant at our choice by exchange of incorrect parts or by repair of the machine in our house. Old parts change into our possession.

Disclaimer of warranty

All parts subjected to wear are excluded from this warranty. Any direct or indirect damage resulting from over-heat or chemical reaction shall void all warranty claims. This also applies to defects to the machine caused by non-observance of this manual or of parts of it. Unauthorized repairs or interventions to the machine will result in the loss of all warranty claims.
We cannot accept subsequent claims from damage or destruction of workpieces worked on in the machine, because we have no knowledge or control over the operating conditions at your site. This is valid in a general manner also for requirements from damage to articles, buildings and persons as well as the environment.

We do not warrant that the function of the machine will meet the customer's requirements or that the operation of the machine will to this regard be error free.
In no event will we be liable to the customer for any incidental, consequential, or indirect damages of any kind, including loss of profit and prosecution for environmental pollution, even if we could have been aware of the possibility of such damages.
All information was arranged with great care. We reserve ourselves however mistake and technical changes without previous announcement.

7.2.2 Dispense Module

We will provide this documentation later

7.2.3 Calibration Module

With a calibration module you will be able to use a camera, mounted on the machine, to calibrate a PCB placed on the machine table.
This is especially handy when you want to do rework on a PCB.

Because the camera has an offset from the spindle, it cannot reach approximately 6 centimeters in the Y direction.
Please keep this in mind while calibrating or using the camera as inspection device.

Rework could be:

- You have a PCB from a client but some mounting holes are to small, so you need to drill them with a bigger tool.
- You have the dispense unit installed and want to calibrate the PCB so the dots will be placed correctly
- You want to cut a hole in a PCB that was already finished.
- etc.

The calibration module has an unique feature that will automaticly center the fiducial.
You may also click in the calibration screen to travel to the position instead of using the arrows.

If you have the calibration module installed, extra camera options will be available, like zoom. (see camera options)

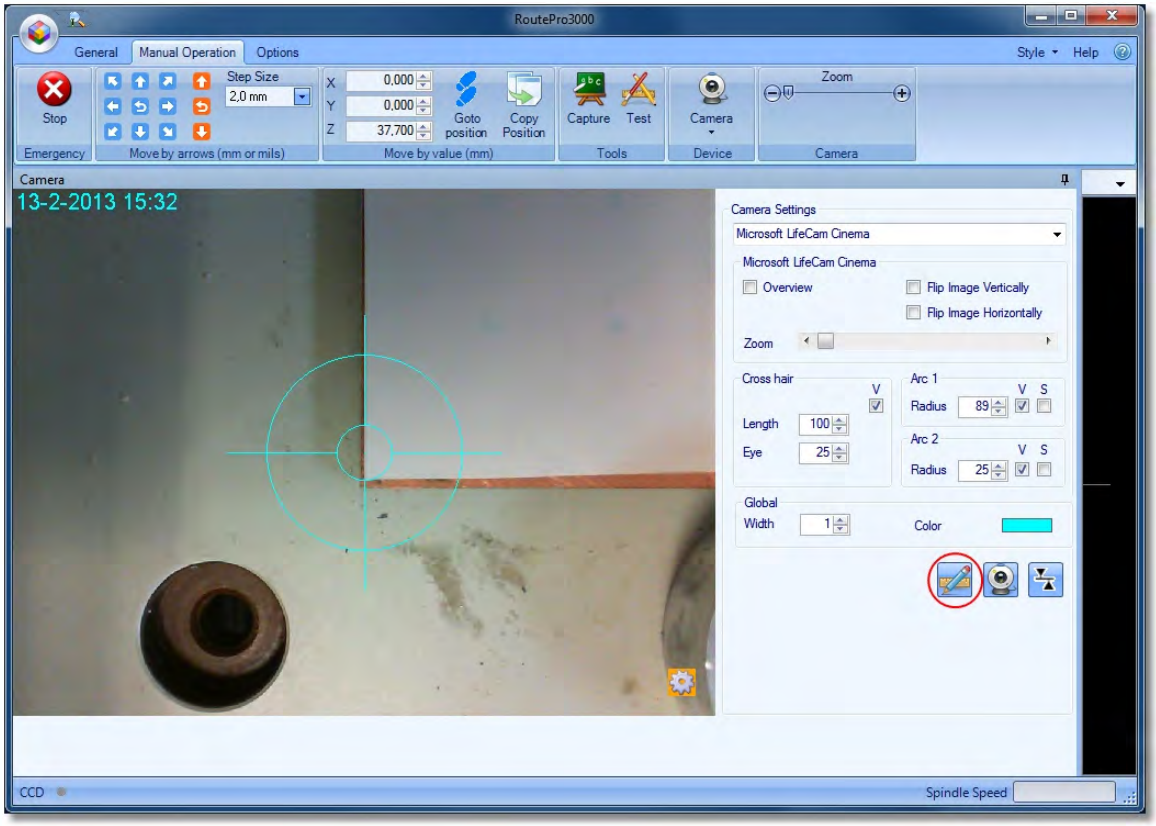
Note: *you need a camera to use the calibration unit.*

Calibrating for mouse positioning.
Before you can use positioning by pointing with the mouse, you need to calibrate the screen with the design.

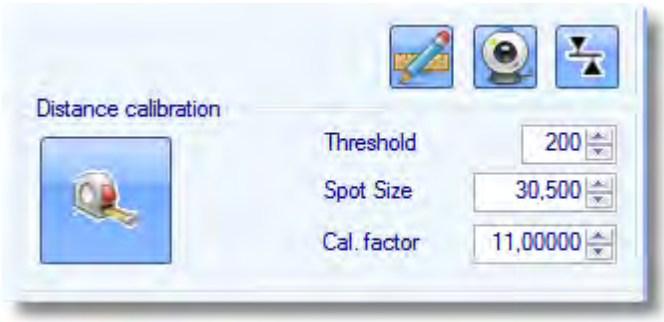
Points you need to take in account:
- The Calibration factor need to be adjusted if the distance from the camera and the board changes.
- So calibrating is optimal if you have your board and underlayment on the table.
- However with the new automatic center option it does not have to be that precise.
- You need reasonable lightning.
- You need a white paper with a black spot for measurement (provided by your dealer when purchas-

ing the calibration module)

Goto manual operations and select the camera mode.
Open the Camera settings screen



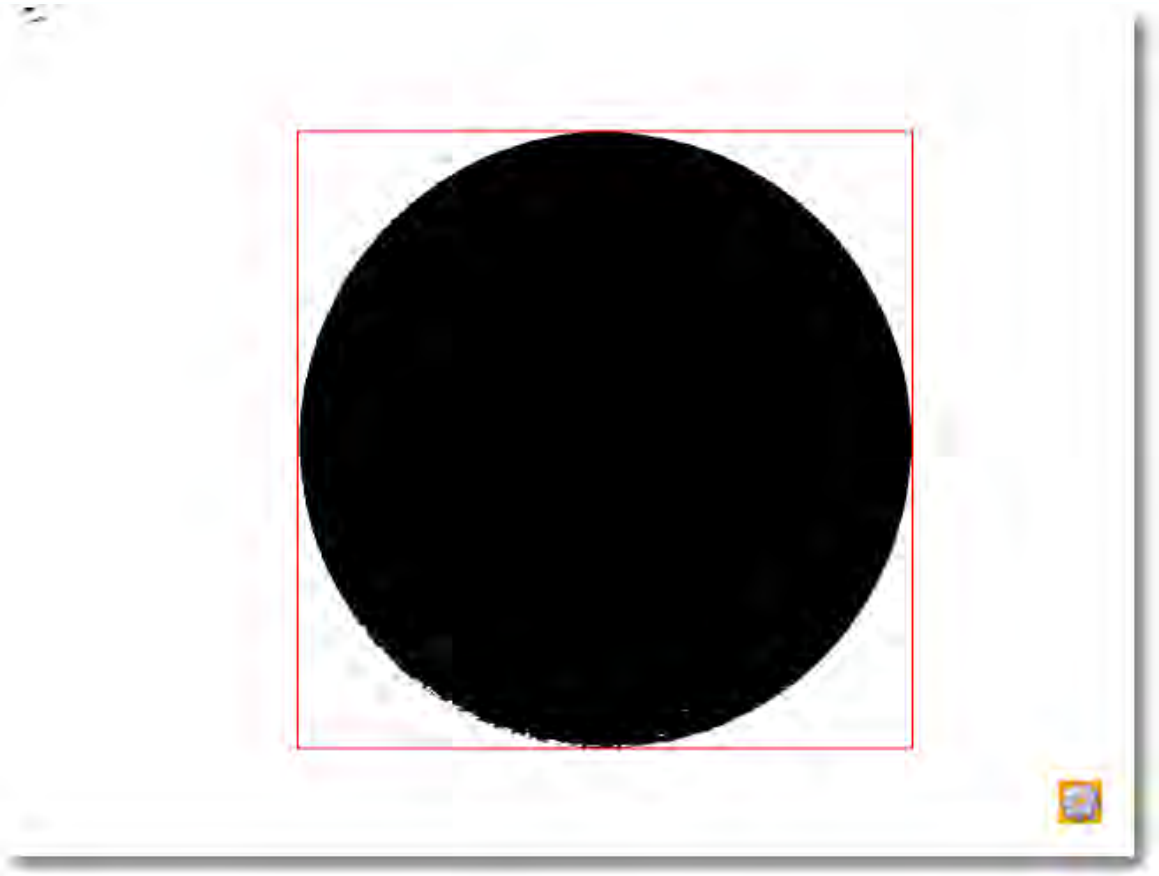
Press the calibration button this will open the next window:



- **Threshold**
  You may change the value to obtain a better measure result.
- **Spot Size**
  This is the size of the spot, used for calibration
- **Cal. factor**
  This holds the calculated calibration factor
- **Calibration button**
  Start the calibration

Now position the spot under the camera so the whole spot is visible. (it does not have to be precise)

Press the Calibration Button.
After that hover over the little white window, showing the spot to check the measurement.
The window will expand and if the spot is surrounded by the red line, the measurement was successful.



The calibration factor is now stored, you may close this option.

If not successful you will get something like the following picture.
You need to increase in this case the threshold and measure again.

Note: *if measurement was unsuccessful the calibration factor will be set to 11,11111*

See also: Calibrating the camera

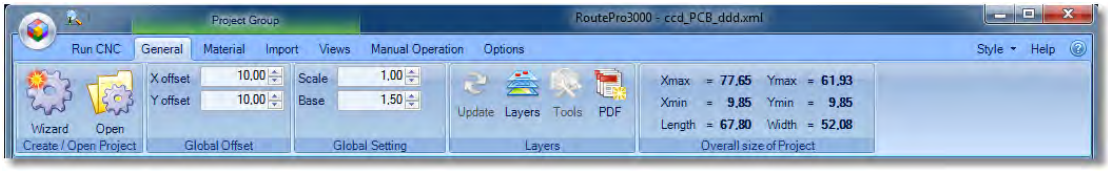
How to Calibrate a PCB read more....

7.2.4 Documentation Module

This documentation module will provide outstanding documentation which you can use for future reference.
You may also handout the project documentation to your customer along with the finished boards.

When the documentation module is activated you'll find a new button under options: PDF
Pressing this button will generate a complete PDF document, containing all the machine settings.

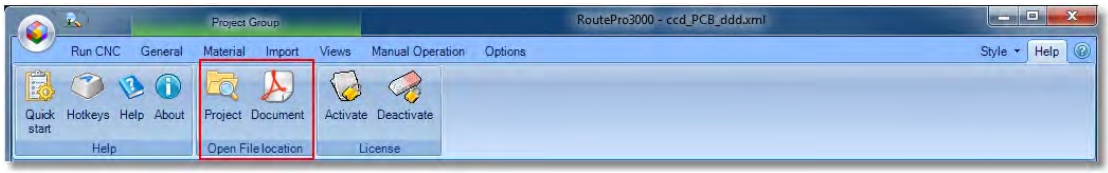
When a project is loaded you'll find also such a button under the general tab.



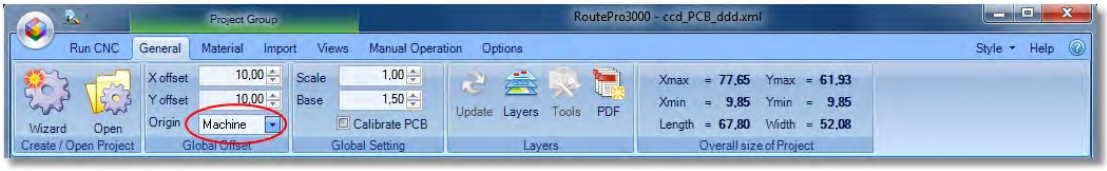
Pressing this button generates a complete PDF document of your current project, including screen shots
of every layer, all the settings and much more.....

7.2.5 RoutePro3000Extra

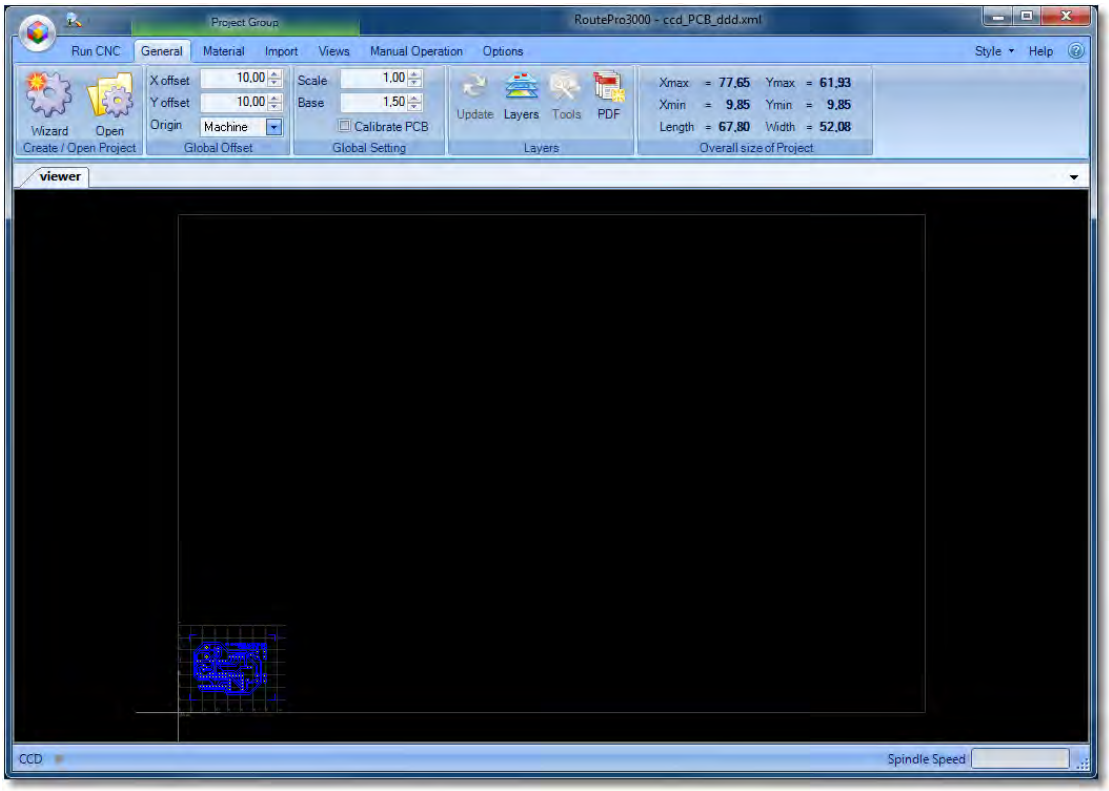
With this module activated you will get the following extra features:



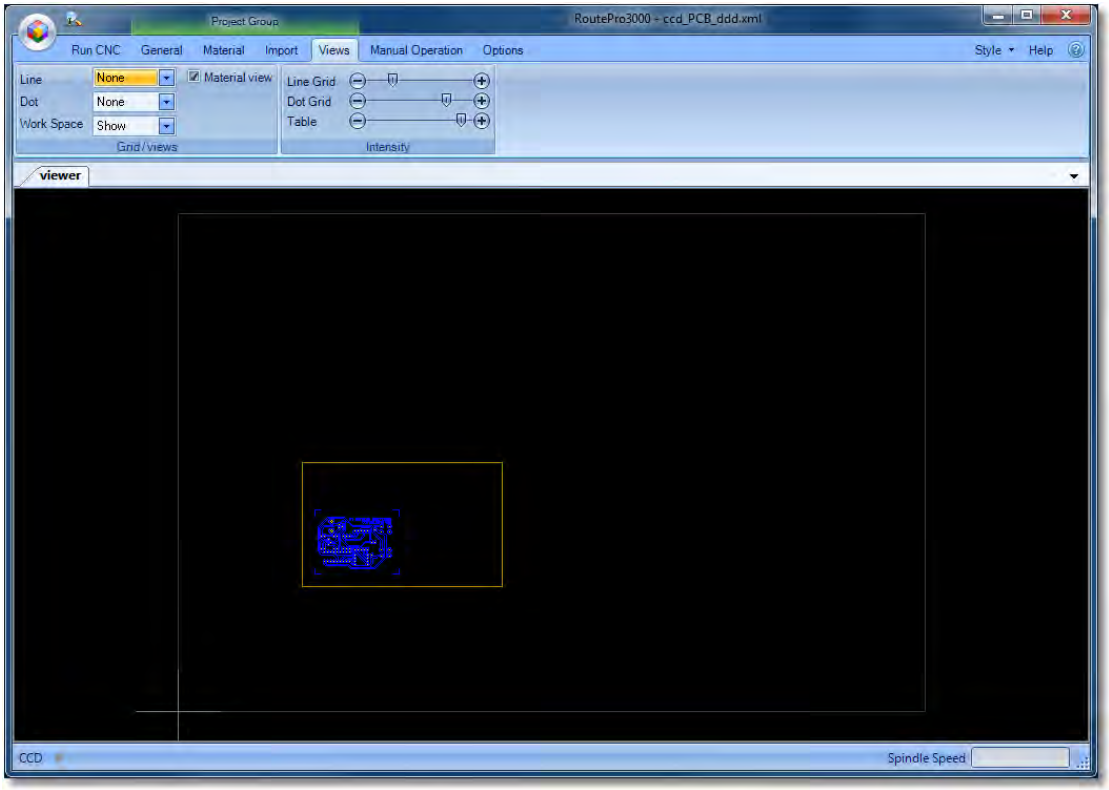
Under the Help tab you'll find two buttons to open the location of the current project and the documentation.



Under the General tab you may now set the origin of your material.
This can be the zero position of machine but can also be calculated from the material position.

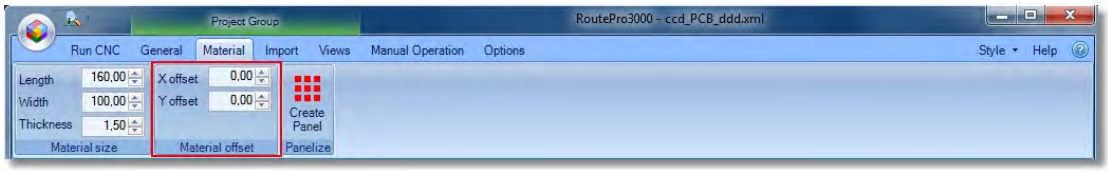


Machine origin



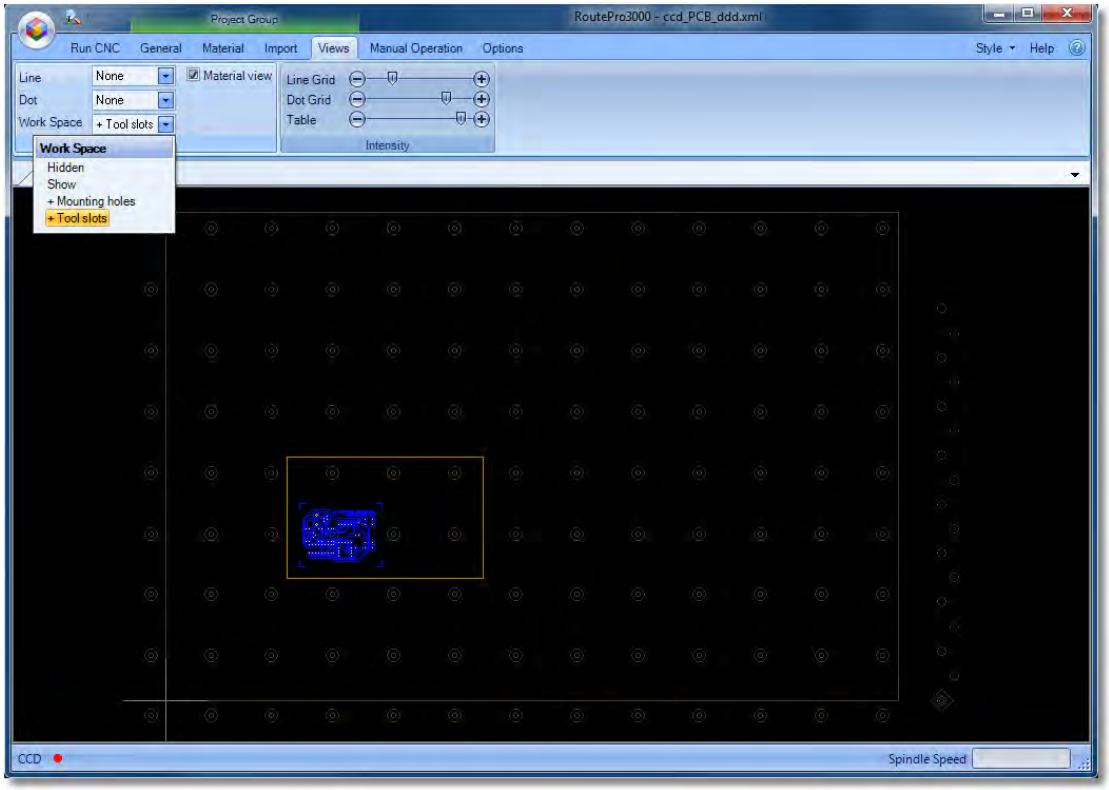
Material Origin

If the material origin is used the program checks if your design fits the material.
You may set an offset for the material under the Material tab

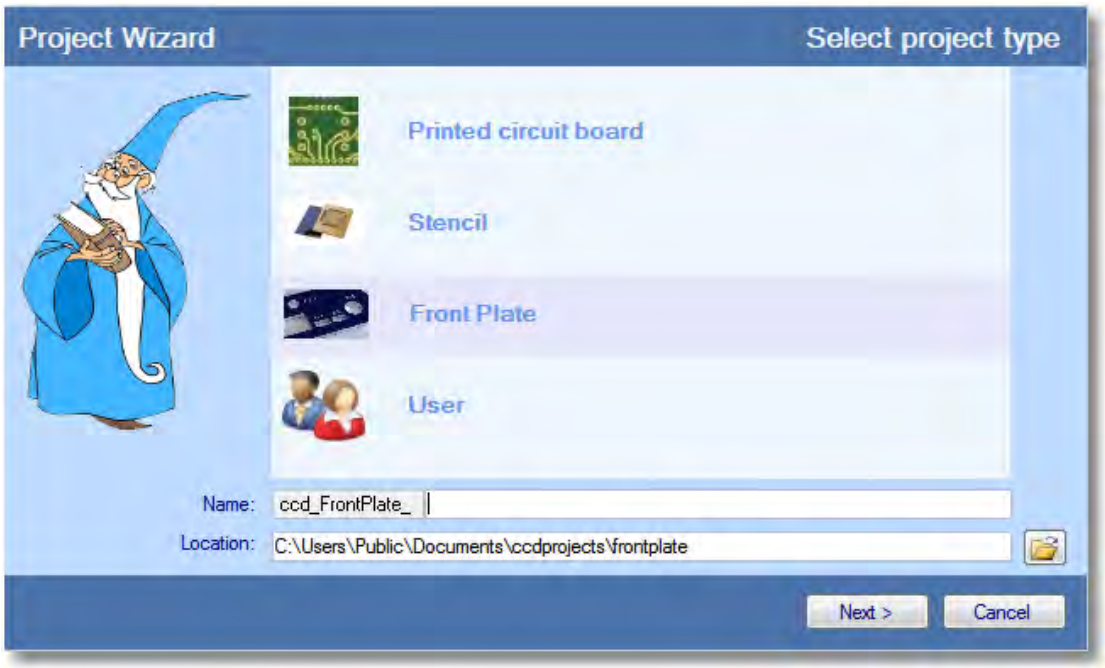


Under the Views tab you now have the following extra's:

- Show material
- Set the intensity of the line grid
- Set the intensity of the dot grid
- Set the intensity of the table view
- Show the mounting holes
- Show the ATC tool-slots and depth sensor



In the Wizard you may now select the type of project, depending on your selection, the project will be stored under the project type name.
This can be useful to separate projects meant for PCB or stencils etc.



But that's not all.....

You may use the mouse to position while the camera screen is open, it will also try to center the drill hole.
This can be useful if you want to capture the holes from an existing PCB.
Please make sure that you calibrate the distance first.

And.....

You may now use up to 32 layers per project !!

7.2.6 Inspection Module

With this module you can inspect your project.

With Preview activated you may simulate a machine run.

In case of a drilling layer the camera will show the drilling positions, as if you were actually drilling.
If you are processing a route layer it will follow the route pattern.

Note: *if the calibration is active for this project, it will first go through the calibration stage.*

If you have checked Inspect, the machine will travel to the first drill position and waits there, so you have time to look at this position closely.
If you press start, the next position will be showed.

Note: *This function will only work on drill layers.*

Because the camera has an offset from the spindle, it cannot reach approximately 6 centimeters in the Y direction.
Please keep this in mind while calibrating or using the camera as inspection device.

7.2.7 Remote Module

This module is under construction, it will be available soon

7.2.8 Script Module

This module is under construction, it will be available soon

7.2.9 Q-Code Module

This module is under construction, it will be available soon.

7.3 Hotkeys

If you have a numeric keypad please turn Num Lock off then you can make full use of the hot keys for driving the machine

The Emergency Button


Esc Emergency stop

Help hot-keys

F1	Shows context sensitive help if available
Alt + F1	Show the hot-key table
Ctrl + F1	Show the Quickstart tutorials
Shift + F1	Show the reference section

Change step size hot-keys

Shift + Up	Increment Metric step size
Shift + Down	Decrement Metric step size
Alt + Up	Increment Imperial step size
Alt + Down	Decrement Imperial step size

Move in XY direction hot-keys

The selected step size determines the distance to travel

Home	Move the head **X- Y+**
Up Arrow	Move the head **Y+**
Page Up	Move the head **X+ Y+**
Right Arrow	Move the head **X+**
Page Down	Move the head **X+ Y-**
Down Arrow	Move the head **Y-**
End	Move the head **X- Y-**
Left Arrow	Move the head **X-**
5 (Num pad)	Move the head to **0,0**

Move in Z direction hot-keys

The selected step size determines the distance to travel

Ctrl Up	Move the head **up**
Ctrl 5 (Num pad)	Move the head completely up
Ctrl Down	Move the head **down**

The viewer hot-keys

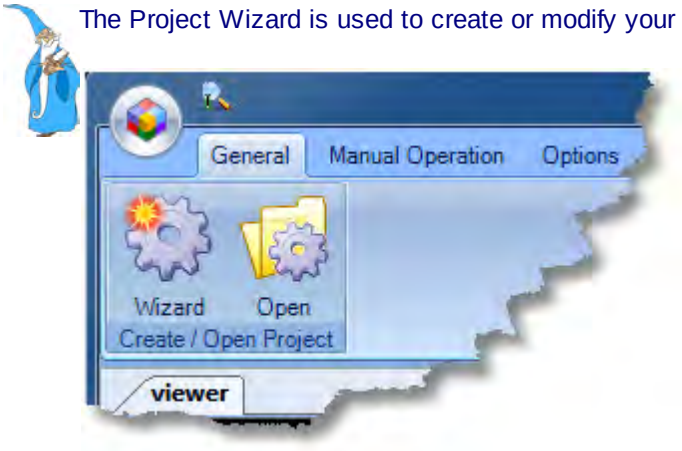
These hot keys are only available if the viewer is the active window
Click in the viewer area to make it the active window.

F8	Zoom all
F5	Refresh Window
z	Zoom in
Z	Zoom out

Ctrl +	Draw zoom window
	Add data to selection by drawing a window around the objects
Shift +	Add data to selection
Alt + Mouse Wheel	Zoom in Zoom out
Only Mouse wheel	Pan up and down
Shift + Mouse Wheel	Pan left and right

7.4 Project Wizard

The Project Wizard is used to create or modify your projects.

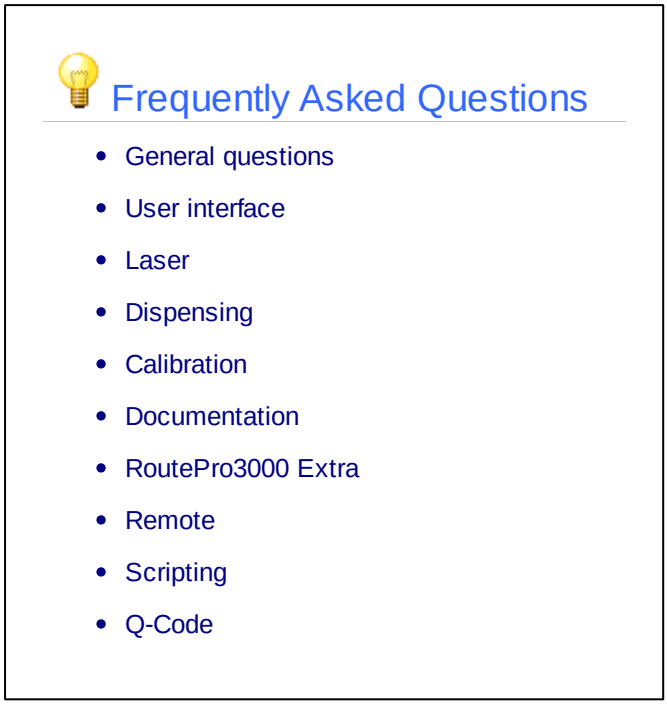


Just click the Project Wizard button to create or modify your project.

Part VIII

8 Frequently Asked Questions

This section covers some problems that are frequently encountered by users of RoutePro3000. The questions are organized by category and where necessary links are provided to relevant sections of the help.



8.1 General questions

Why can I not load a single file for processing?

In the old RoutePro versions, you could load a single file for processing, this is not possible in RoutePro3000.
Parameters used to process the data can only be set in projects, there is no way to set these parameters for single files.
Projects are build using the Project Wizard, which does a lot of complicated stuff, but is very easy to use. So there is really no need in loading single files.

I have a special purpose for my machine, is it possible you provide a module for that?

Yes, our programmers can integrate special modules to handle all your specific needs.
Contact your supplier and provide a global wish list. We will investigate what's possible and provide you an offer for that.

I have found a problem in RoutePro3000, what should I do?

After many many hours of testing RoutePro3000 it is always possible that RoutePro3000 does not what it supposed to do.

If you find a problem with the software you can send us an email with detailed description of the problem plus screen shots,
and most important, how did it occur. Can it be reproduced?

We will try to solve the problem directly if it is a problem that effects the whole program else it will be solved in the next release.

Note: *Sometimes RoutePro3000 gives you the opportunity to send an error report, please do that as well, this makes problem solving much easier*

▾I have an idea for a feature in RoutePro3000

We highly appreciate your input.
If you have suggestion of how to improve RoutePro3000 please tell us, if we think it is useful for other users as well, we can implement this in a next version.

▾I have read the help manual but still need support, what can I do?

We can offer you support, read more about our support policy.

8.2 User interface questions

▾I have loaded my data files but the drill data has a different size then my other data.

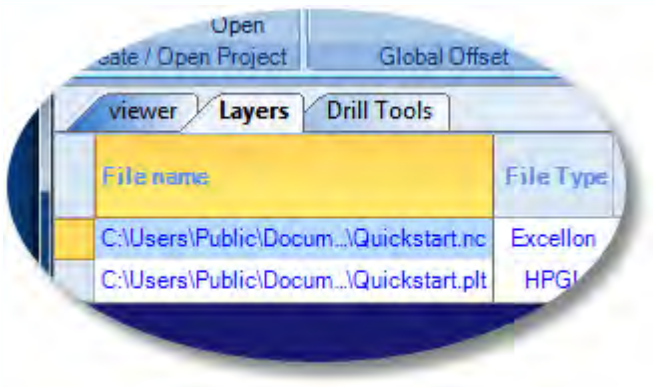
The problem is that the import settings are not correct, show solution...

▾Can I change the processing order of the layers / tools in the table?

Yes you can, read more....

▾I only see the tools from the first layer.

To see tools from other layers, select the layers tab to show the layer window and select a layer. The tool window will change for the tools of the selected layer.



8.3 LaserPro questions

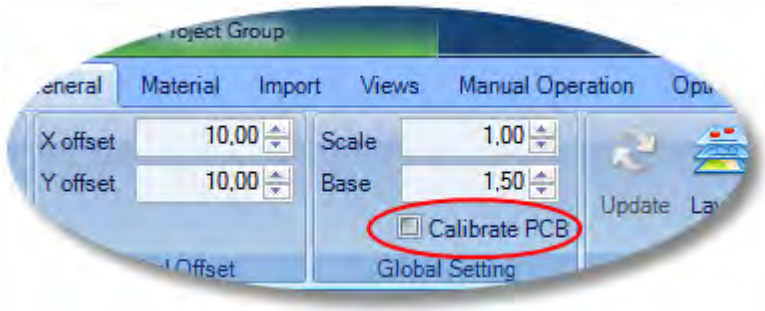
8.4 DispPro questions

8.5 Calibration questions

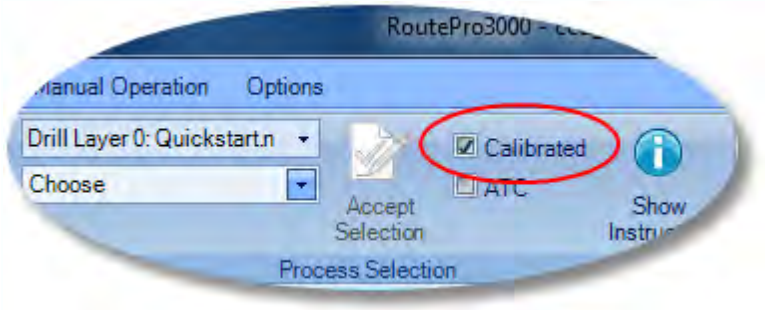
▾I have the calibration unit enabled but I do not need calibration for now, what do I do?

You have two options here:

Uncheck the Calibrate PCB box in the General tab.

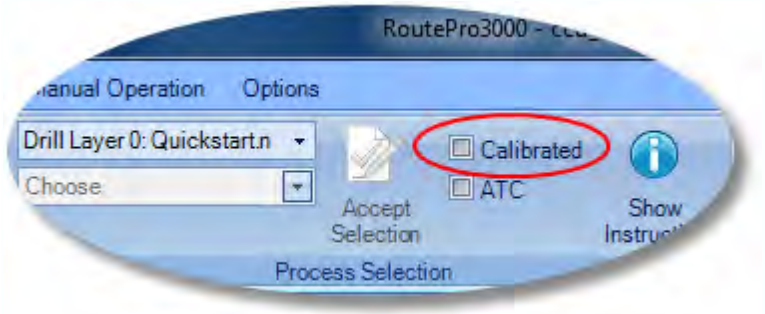


Check the design is Calibrated box under the Run CNC tab



▾I want to do another Calibration, because I moved the material.

Just uncheck design is Calibrated box under the Run CNC tab.



8.6 License system

▾Why do I need to registrate / activate RoutePro3000?

Using a license system enables us to provide you with modules for particular features.
It gives you the opportunity to select only modules you need so you don't pay for something you will not use. Read more.....

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